Issue 162

PS

1966 Series

THE PREVENTIVE MAINTENANCE MONTHLY

SHOOT FOR —

COMPLETE

One of the biggest problems bugging many a supply and maintenance man these days is how to get all the little odds and ends of common hardware, fittings, cleaning materials—the "nuts-and-bolts" type stuff which may not appear in your equipment's parts manuals. So, where do you find them?

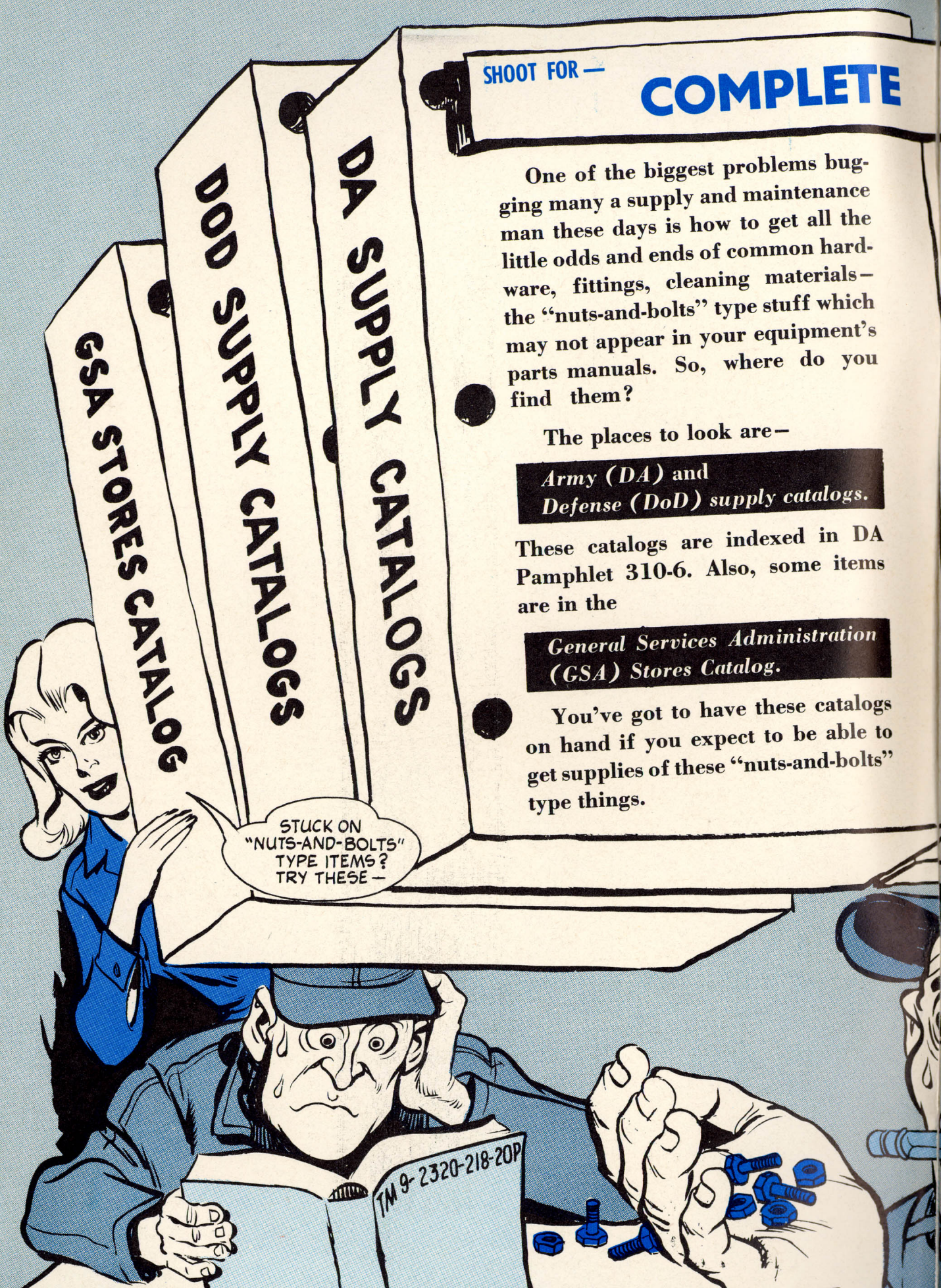
The places to look are—

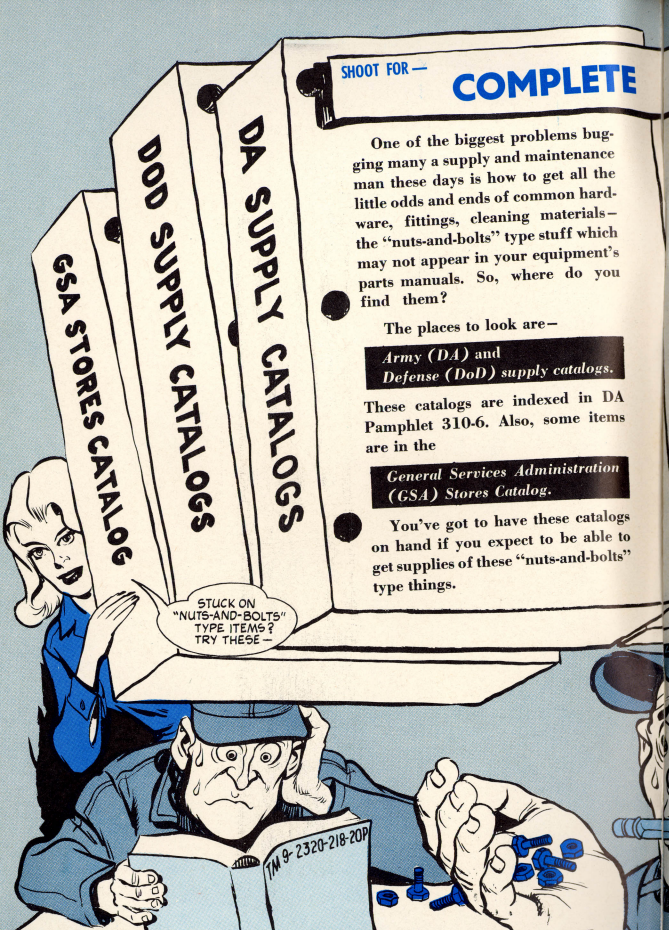
Army (DA) and Defense (DoD) supply catalogs.

These catalogs are indexed in DA Pamphlet 310-6. Also, some items are in the

General Services Administration (GSA) Stores Catalog.

You've got to have these catalogs on hand if you expect to be able to get supplies of these "nuts-and-bolts" type things.





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You can get the DA and DoD supply catalogs on pin-point distribution by setting up your order for them on DA Form 12-21. You order by Federal group and commodity identification listed on the form. You might need Group 40 for Rope, Chains and Fittings, for example. Or, Group 51 for Hand Tools, or Group 53 for Hardware and Abrasives. Scan the index, Pam 310-6, real tight.

Get the nearest GSA supply center address from your support unit and send there for a copy of the latest (January 1966) GSA catalog. In it you find pipe fittings, paint, cleaning compounds, hand tools and scads of other items. Ask GSA to put your outfit on the list for new catalogs.

You're not with the complete story on supply unless you're up on the DoD, GSA *and* DA supply pubs. Try 'em all for size.

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Sgt. Half-Mast,
PS Magazine,
Fort Knox, Ky.
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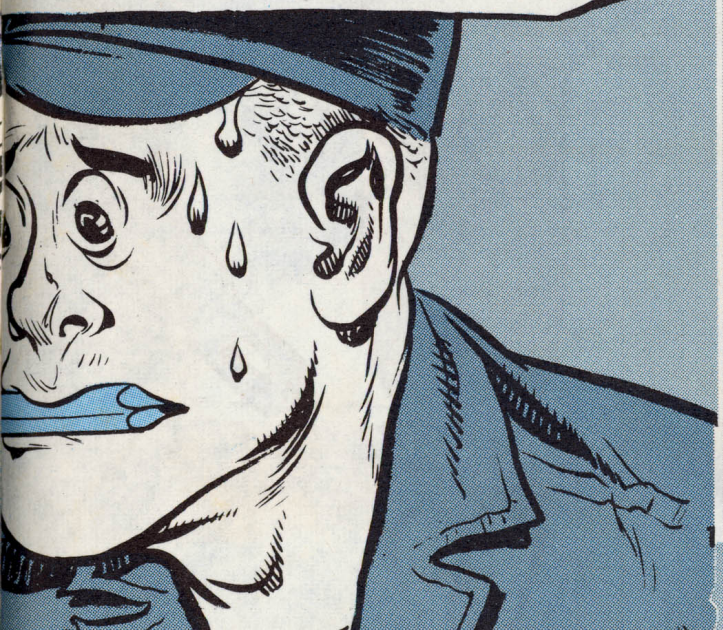

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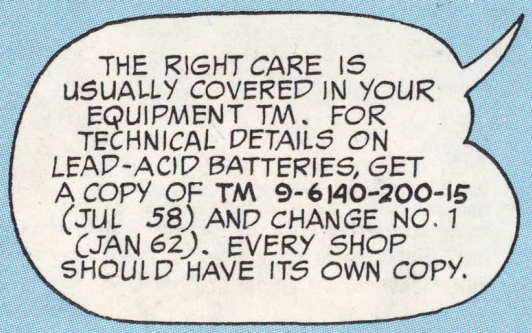
LIKE IT'S MAGIC

THAT LITTLE BLACK BOX

With nothing more than the right combination of sulfuric acid and water working on lead plates, your battery pumps hot, sizzling juice into the cold, cold carcass of your equipment, turning it from a lifeless lump of motionless metal into a growling, roarin' or purrin' performer.

Just like a heart, it'll pump out the life substance your equipment needs over and over again. A battery is recharged or made good and healthy again when electricity is pumped back thru it opposite from the way it came out. This reverses the chemical action in the black box and puts things back pretty much the way they were.

Your battery can go on putting out, getting pooped, getting recharged, putting out, etc., for a long time — if it gets the right care.



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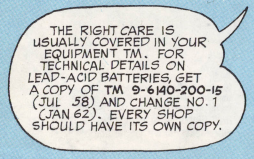
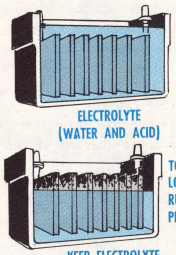


FEED THE BATTERY WATER INSIDE

The brain behind the healthy life of a battery is the guy who runs or operates the piece of equipment it's in. All he has to worry about inside the battery is the water that's already mixed in with the acid. In the battery business this is called the electrolyte. The water you add to the electrolyte is all the food it needs . . . but it must be portioned out with care.

Not much of the acid is likely to get out but the water is sneakin' out the vents — in the form of vapor — just about all the time your battery is working. So you've got to make sure there's enough electrolyte by adding water when it's needed.

If the electrolyte drops below the tops of those lead plates, air will bite into the bare tops and the plates will go to pot real soon. Then your battery is just another weak ticker and won't put out like it's supposed to.



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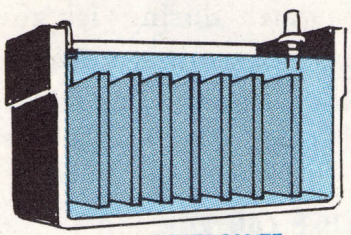
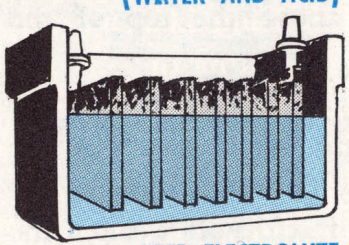


RIGHT WATER LEVEL

ELECTROLYTE (WATER AND ACID)



TOO LOW — RUINS PLATES

KEEP ELECTROLYTE ABOVE PLATES ALWAYS

PS MORE

WHAT KIND OF WATER?

Distilled water is what your battery wants when it's thirsty. Distilled water doesn't have any minerals or other chemicals to louse up the exact chemical action needed to keep the box healthy.

NOTHING BUT THE BEST — UNLESS

In a pinch, of course, any water is better than none. This'll range from clean spring water down to tap water or even down to whatever you can find. But if you have to use water that looks dirty, let it stand for a while so the dirt will settle to the bottom, then carefully take the water off the top.

And remember to be mighty careful when adding water during freezing weather. Be sure the equipment's operated for at least an hour after adding water or the electrolyte'll freeze.

CURE CAN KILL

The right level for the electrolyte is about 3/8-inch above the top of the plates.

Too much water is as bad as too little. Overfilling, so it runs out the filler holes, may flood out some of the acid. Any loss of acid will weaken the electrolyte.

And that acid in the electrolyte will attack any metal it reaches — like clamps, bolts, lugs, cables, lifting handles and the box or carrier.

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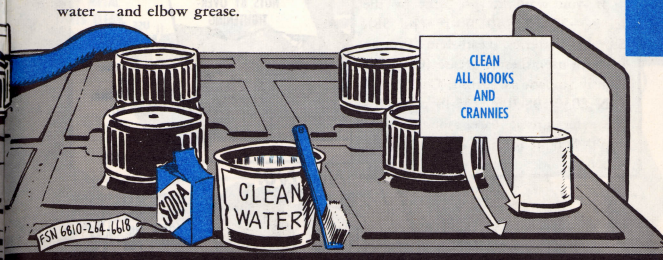
COUNTERATTACK

Corrosion on and around batteries is bad enough anyway, what with the acid fumes that're always coming out the vents and settling on the battery top and nearby metal parts. The battery's got to be vented to relieve pressure, so you've got to be on your toes to keep corrosion away.

When those fumes and vapors dry on top of your battery and become "electrolyte salts," your battery will discharge across the top. Dust and dirt on top of your battery will do this, too, when it's damp. If you've got those batteries with soft tops, you may find dust sticks easier, so cleaning is needed more often.

All you need to fight these enemies are a brush, baking soda solution, fresh water — and elbow grease.



HOW TO CLEAN

PULLING ACID'S TEETH

After you've washed and scrubbed the battery top and cable connections with fresh water, go after 'em again with the soda solution. This'll neutralize any acid hiding out in little nooks and crannies.

None of the soda should get inside the battery to weaken the electrolyte. Make sure caps are tight and that solution isn't flooded into the holes in the caps or other vents.

After the foaming has stopped, rinse off the battery top and dry it good.

If you have to take the terminal clamps off to get at all the corrosion, smear a thin coat of grease on the posts and clamps before putting 'em back on.

Whether you grease the battery post before or after the clamp's put on doesn't make much difference — but if it comes to an argument, your maintenance officer can settle it one way or the other. What's important is to get all exposed parts of the post and clamp covered with a thin coat of grease — especially the bottom of the post, the underside of the clamp and the steel bolt and nut. Make sure, tho, that any old corrosion and dirt are cleaned off before greasing.

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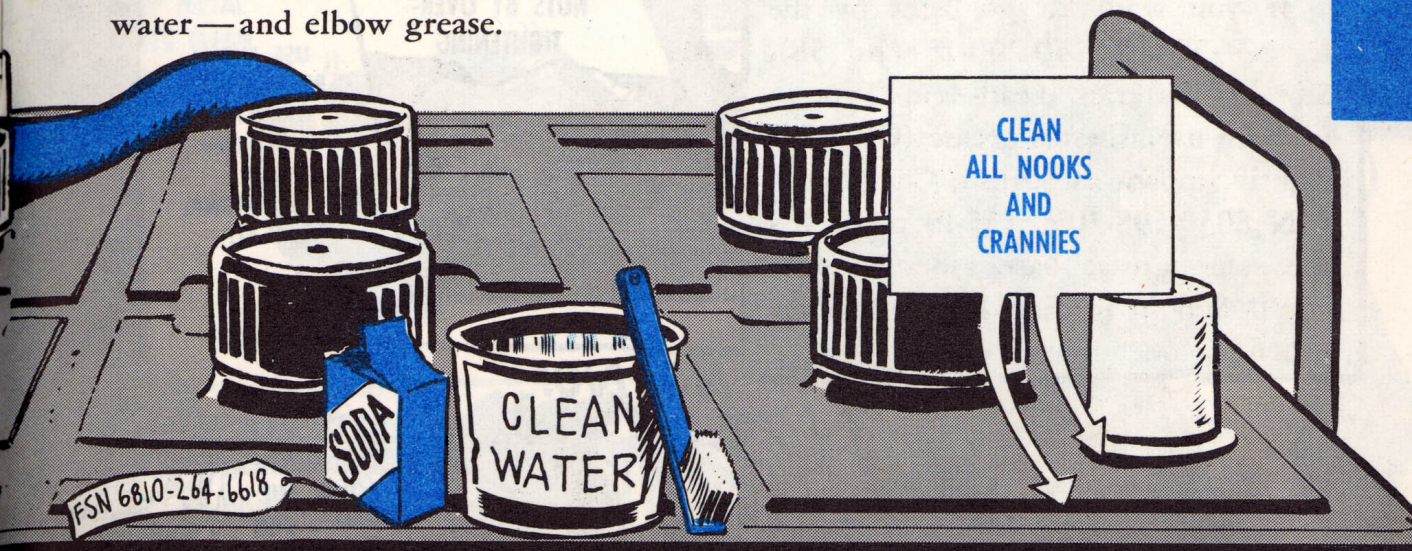

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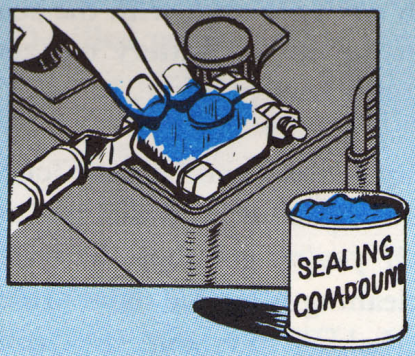
PS MORE

TERMINAL GREASE



If you want to go right by the letter—TM 9-6140-200-15 (Jul 58), Storage Batteries, Lead-Acid Type—you can use asbestos grease (GK). It's rightly known as Sealing Compound, FSN 8030-598-3059 (35-lb pail). It's the same grease base asbestos paste you'll find in fording kits for waterproofing.

USE GOOD OLE HANDY GAA... IT'S GREAT.

DON'T BUTCHER NUTS BY OVER-TIGHTENING

USE THE RIGHT SIZE WRENCH. GET IT FROM YOUR ORGANIZATIONAL TOOL KIT.

NO! NO!

E-A-S-Y MAN! WHEN YOU CHECK THE CLAMPS FOR FIT AFTER YOU PUT 'EM BACK ON . . . DO IT EASY . . . BRUTE FORCE ISN'T NEEDED.

LIKE SO

TAKE A HOLD OF THE CLAMP ITSELF—TWO FINGERS AND A THUMB, WIGGLE IT BACK AND FORTH . . . AND UP 'N' DOWN . . . IF IT DOESN'T WIGGLE, IT'S OK.

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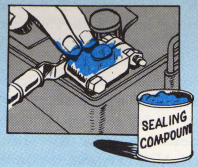

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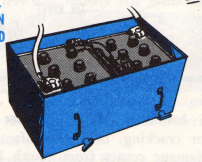
METAL PARTS

Some batteries (the 6TN) have metal carrying handles. All batteries are held snug in metal boxes or on metal trays by metal holddowns. This's a lot of metal offering an invitation to corrosion.

KEEP METAL PARTS CLEAN AND PAINTED



POUR SOME WATER OVER YOUR WHEELED VEHICLE BATTERIES EVER SO OFTEN.

FORGET THE PENNY BIT... LEAVING A PENNY ON THE TOP DOESN'T STOP OR CUT CORROSION ENOUGH FOR THE TROUBLE.

HOLDDOWNS AND CARRIERS

USE BLOWTORCH TO GET CORROSION OFF UNDER LOOSE PAINT. FOLLOW UP WITH A WIRE BRUSH AND PAINT IT.

SOAKING AND PAINTING HOLDDOWNS AND CARRIERS

SOAKING IN A SODA SOLUTION IS ANOTHER WAY TO LOOSEN CORROSION

MAKE A SOAK TUB OUT OF AN OLD OIL DRUM.

AFTER SOAKING, RINSE WITH FRESH WATER, DRY THOROUGHLY AND PAINT.

HERE'S HOW TO GET A GALLON: ASK FOR COATING COMPOUND BITUMINOUS FSN 8030-290-5141.

DA PAM MORE

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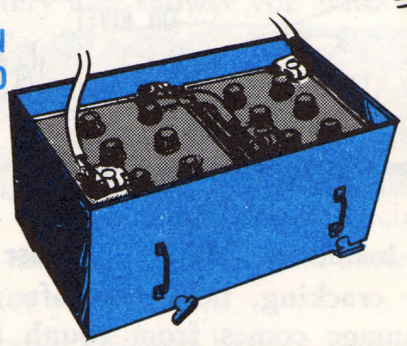

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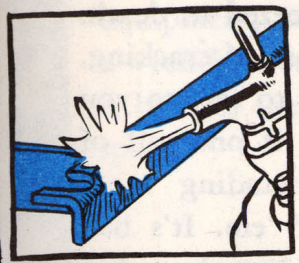

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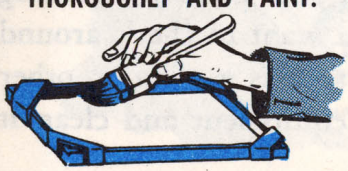

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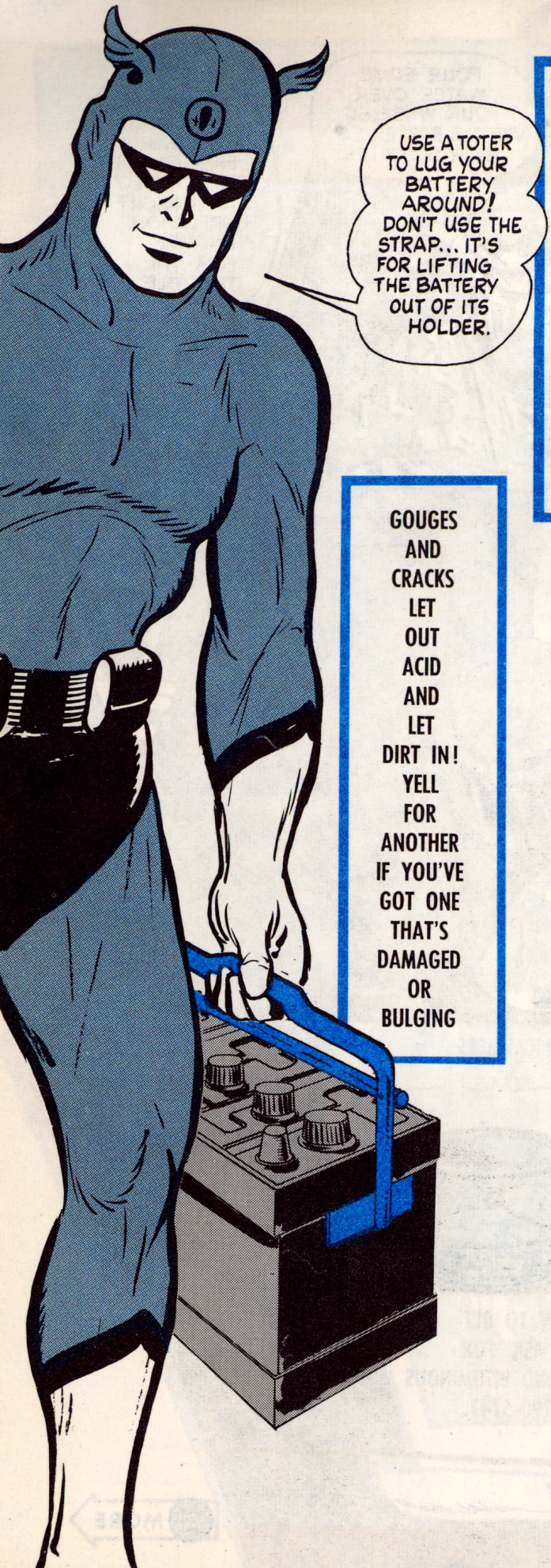
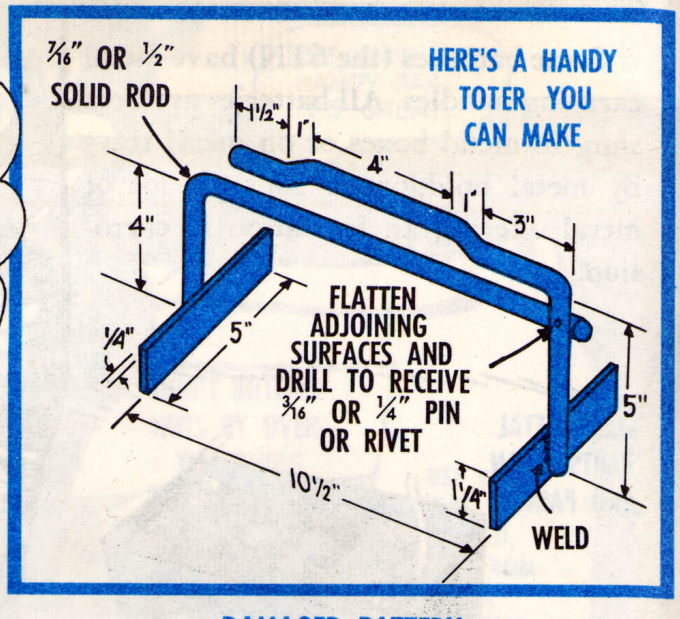




DAMAGED BATTERY

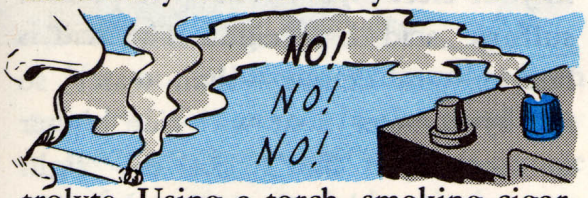
Inside trouble could cause bulging or cracking, but more often battery damage comes from rough handling and poor maintenance—dropping or holddowns too tight. Holddowns have to be snug enough to keep the battery from rattling around but not so tight that the battery is squeezed to death. Freezing is another cause of cracking.

Cracks may be hard to see, so you want to get suspicious if one cell of the battery starts demanding more water than the rest of 'em. It's bad enough to be losing electrolyte, but when acid solution leaks onto fuel lines and other metal parts of your equipment, you'll have more headaches than a weak or dead battery. This's especially likely to happen to parts on the M60, M60A1 and M48A3 tanks because of their positions near the batteries.

Naturally, if your battery is leaking electrolyte, you want to check around and see if this stuff is getting on other parts of your equipment and clean it off fast.

GAS IS DYNAMITE

That gas coming out of your battery, if it's ignited, may blow the battery to smithereens, sock you with chunks of the battery and shower you with elec-



trolyte. Using a torch, smoking cigarettes or making sparks around batteries is bad for your health.

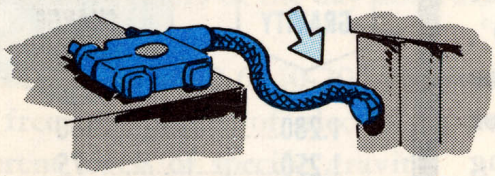
A freshly charged battery is touchy on account of putting out a lot of hydrogen gas. It should sit for an hour or so after coming off the charger to let it "cool" off. If it has to go right in your equipment, be careful you don't drop a wrench or other tool on the battery so it bridges the terminals and throws a spark.

When you start to take the cables off the posts, or put 'em on, take the ground (negative) cable off first and put it on last. And make sure all electrical switches are off. Then you'll get no sparks jumping to that hydrogen gas. On vehicles like tanks that have several ground cables, remove them all —not just one.

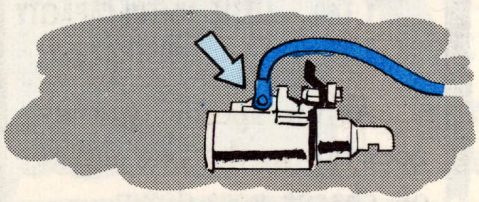
Some commercial vehicles and engineer equipment, tho, have a positive ground instead of negative. Then it's the positive cable that comes off first and goes on last. Check your TM to be sure.

WHICH IS WHICH?

GROUND CABLE CONNECTED TO BODY, FRAME OR ENGINE BLOCK



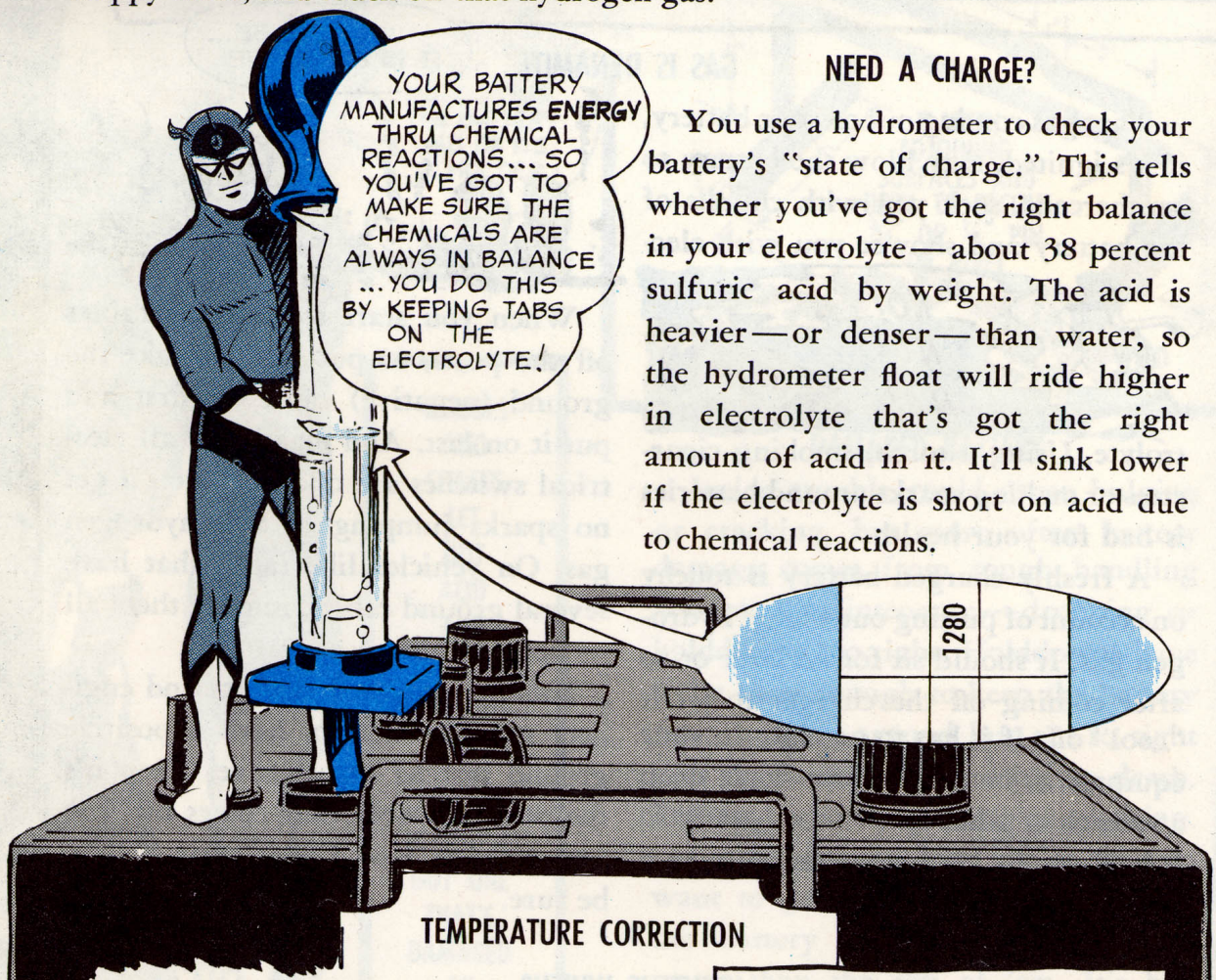
OTHER CABLE GOES TO STARTER OR STARTER SOLENOID



If some heavy-fisted galoot has mashed the posts so you can't recognize 'em easy, paint little "+" and "−" symbols on the side of the battery close to the right posts or paint the top of the positive post red. This's a help, too, in training so the cables don't get put on the wrong posts. The wrong hookup will reverse the battery's polarity and soon ruin the battery. AR 750-5 authorizes your CO to OK such aids for training.

PS MORE

Connections between cable lugs and clamps and between the clamps and battery posts have to be clean and tight or your battery won't deliver the punch you need. You could get dangerous sparking, too, if these connections are sloppy loose, and touch off that hydrogen gas.



NEED A CHARGE?

You use a hydrometer to check your battery's "state of charge." This tells whether you've got the right balance in your electrolyte—about 38 percent sulfuric acid by weight. The acid is heavier—or denser—than water, so the hydrometer float will ride higher in electrolyte that's got the right amount of acid in it. It'll sink lower if the electrolyte is short on acid due to chemical reactions.

TEMPERATURE CORRECTION

Where the temperature is about 80°F you should get a specific gravity reading of 1.280 on your hydrometer. The hydrometer scale is figured for 80°, so you have to make a correction on the reading if the temperature is hotter or colder. Subtract four from the reading for every 10 degrees below 80° or add four to the reading for every 10 degrees above 80°.

Usually a reading anywhere between 1.250 and 1.300 (corrected for temperature, of course) means your battery's in good shape.

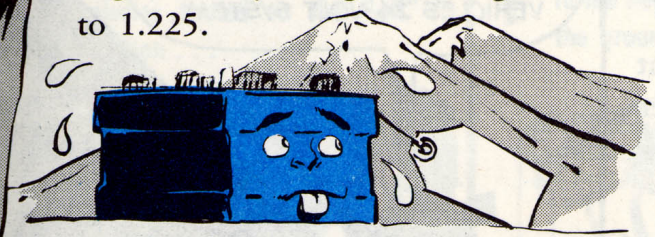
STATE OF CHARGE WITH GRAVITY CORRECTED TO 80°F

SPECIFIC GRAVITY	STATE OF CHARGE PERCENT
1.280	100
1.250	75
1.220	50
1.190	25
1.160	LITTLE USEFUL CAPACITY
1.130	DISCHARGED

As the specific gravity goes down, the percentage of charge goes down.

PALM TREES 'N' BLIZZARDS

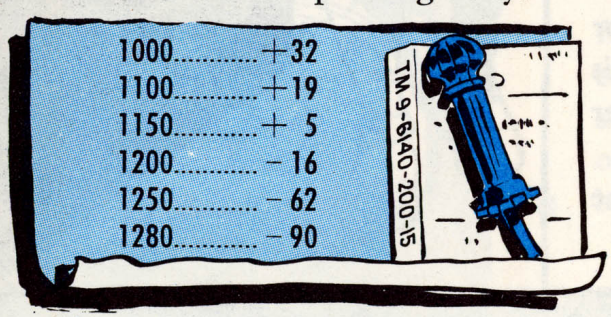
In the tropics your battery's electrolyte is usually diluted more with water to give a fully-charged reading of 1.200 to 1.225.



You can tell if your battery has been prepared for service in the tropics by a special tag, giving the full-charge specific gravity, attached to the battery. And there'll be a one-inch white spot painted on the battery top. If your battery is the non-military type, it may have exposed cell connector straps and these'll be painted white.

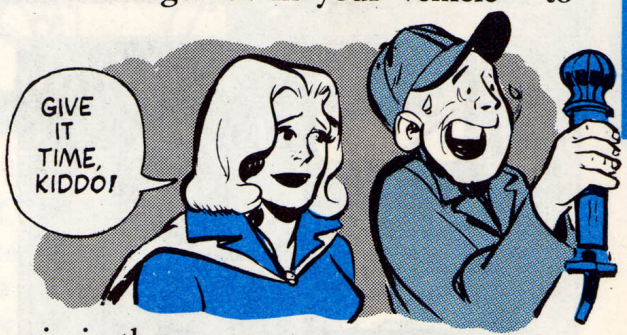
In snow-and-ice country, water in the electrolyte can freeze. So be careful to keep the specific gravity up. Besides, your battery has to work a lot harder—pushing the starter and engine against cold-thickened oil, feeding the lights during more hours of the day and running heaters.

Table IV in TM 9-6140-200-15 gives the freezing points of electrolyte at different levels of specific gravity.



BUM READING

Whether you're where it's hot or cold, tho, you won't get a true specific gravity reading if your electrolyte is low on water. And if you do have to add water, hold off on taking a hydrometer reading until the battery has been charged for an hour or so—either on a charger or in your vehicle—to



mix in the new water.

In the tropics evaporation will steal your water faster than where it's cooler.

Water shouldn't be added where there's danger of freezing unless the battery's in a warm place or unless it'll be in operating equipment for at least an hour. Otherwise you could wind up with a frozen or busted battery.

If a battery does get frozen, it should be thawed out slowly. And never put a frozen battery on a charger.

You'll get a bum hydrometer reading, too, if you've just put a heavy load on the battery—like long cranking of the engine. The electrolyte will be stronger at the top because heavy discharging uses some of the acid next to the plates. So you wait a couple of hours for the electrolyte to even out.

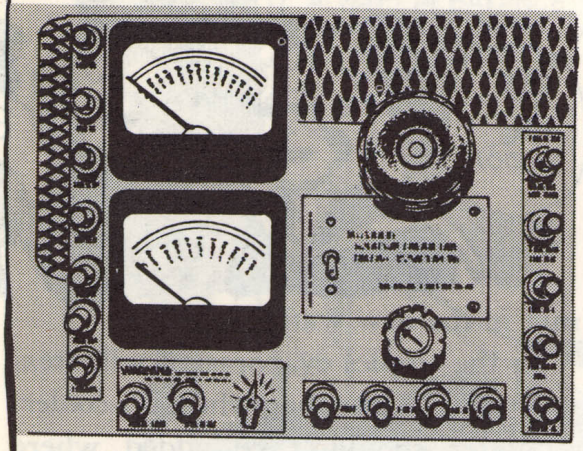
And at anytime if you find a variation between cell reading in excess of 25 points have your support look over the battery and adjust the acid, if it's necessary.

P.S. MORE

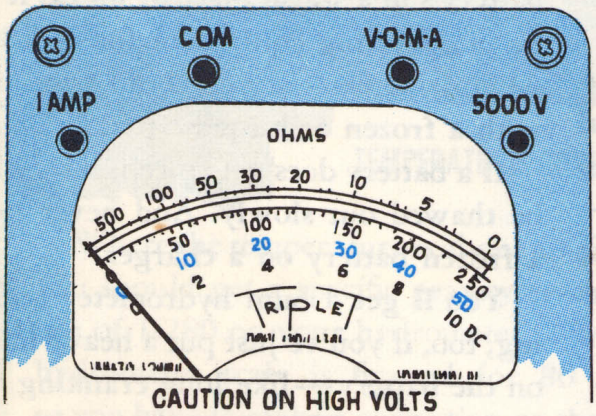
POOP TEST

Has your battery got the poop to take care of all the electrical demands —and still bounce back to do it all over again?

Your company mechanic can find out for you by using either the voltmeter section of a low-voltage circuit tester



or the voltage scale of a multimeter.



CAUTION ON HIGH VOLTS

Both instruments are in the No. 1 supplemental tool kit for organizational maintenance common tool set. But for this simple test, the multimeter is handier because it's smaller and easier to handle.

Steps for testing are pretty much the same in all types of equipment.

POOP TEST

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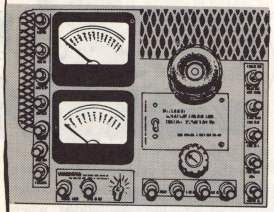

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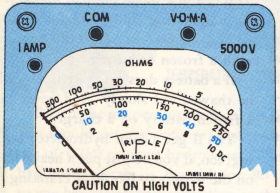

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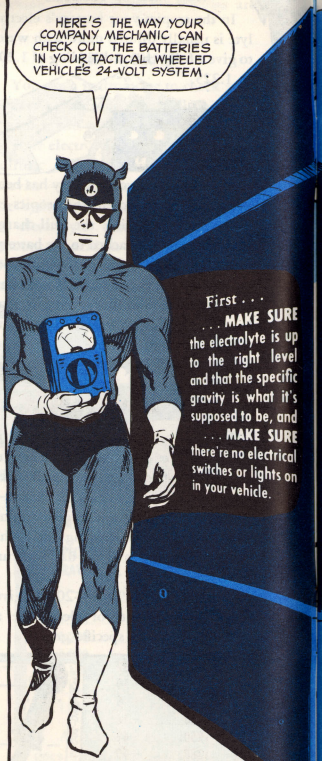
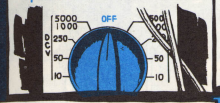
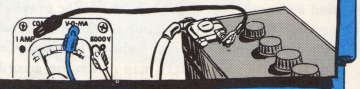


Then, with the multimeter selector turned to the "off" position . . .

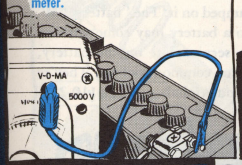


1 Connect the negative (−) lead of your multimeter to the negative (−) post of the first battery — where the ground cable's fastened.

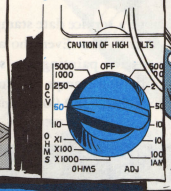


2 Connect the positive (+) lead from the multimeter to the positive (+) terminal of your second battery — the one the starter cable's hooked to.

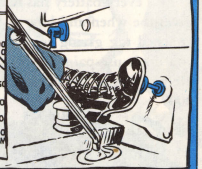
You've got to have clean, snug connections. Dirt and corrosion will cut down on some of the voltage that should show up on the multimeter.

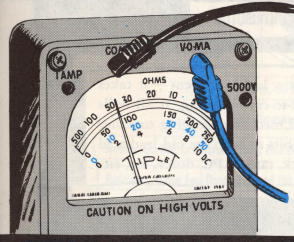


3 Turn the indicator to 50 volts DC. You should read between 23 and 26 volts on the meter scale. This'll show you've got the meter connected right.



4 With the ignition switch off, crank your engine — but for not more than 10 seconds — and watch your meter while this's going on. If your meter reads 18 volts or more, your batteries are OK.





You've got battery trouble if the voltage drops well below 18 while you're cranking the engine —maybe like plates busted loose from the terminals. Then you turn both batteries in and get a new set. Your battery man will check out the old ones and match one or both of 'em up with others.

MORE

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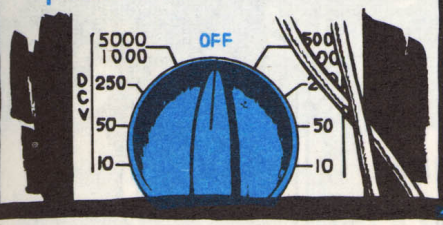

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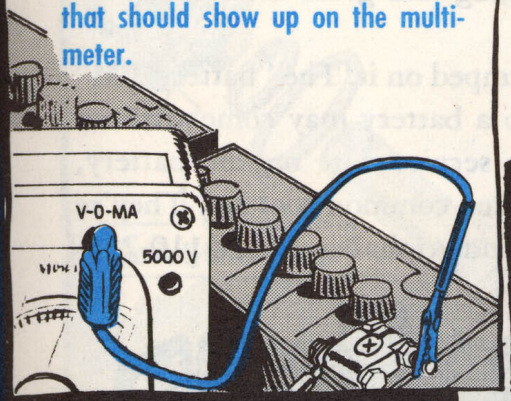

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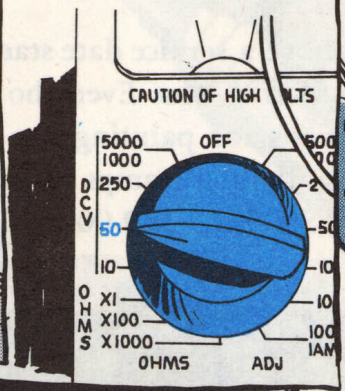

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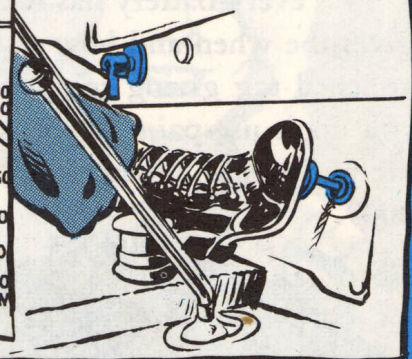

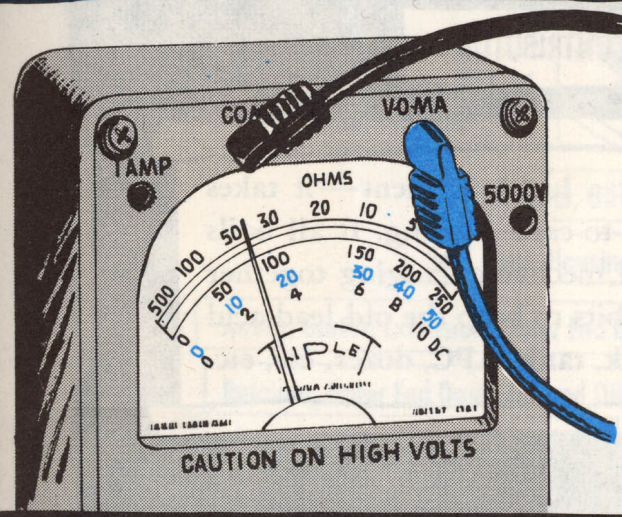

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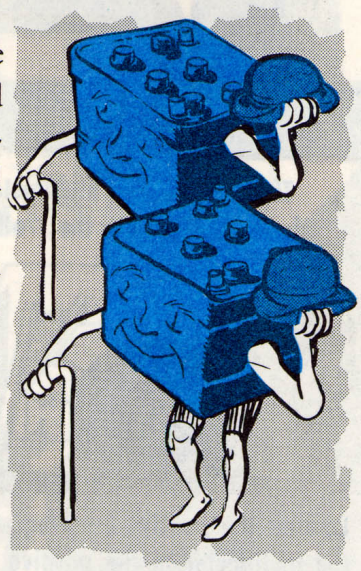
PS MORE

MATCHED BATTERIES



When the batteries in your electrical system are matched, they act like a pair of teamed horses. The load isn't put on only one part of the team. Unmatched batteries can cause damage to the stronger one and will eventually shorten the life of the whole set.

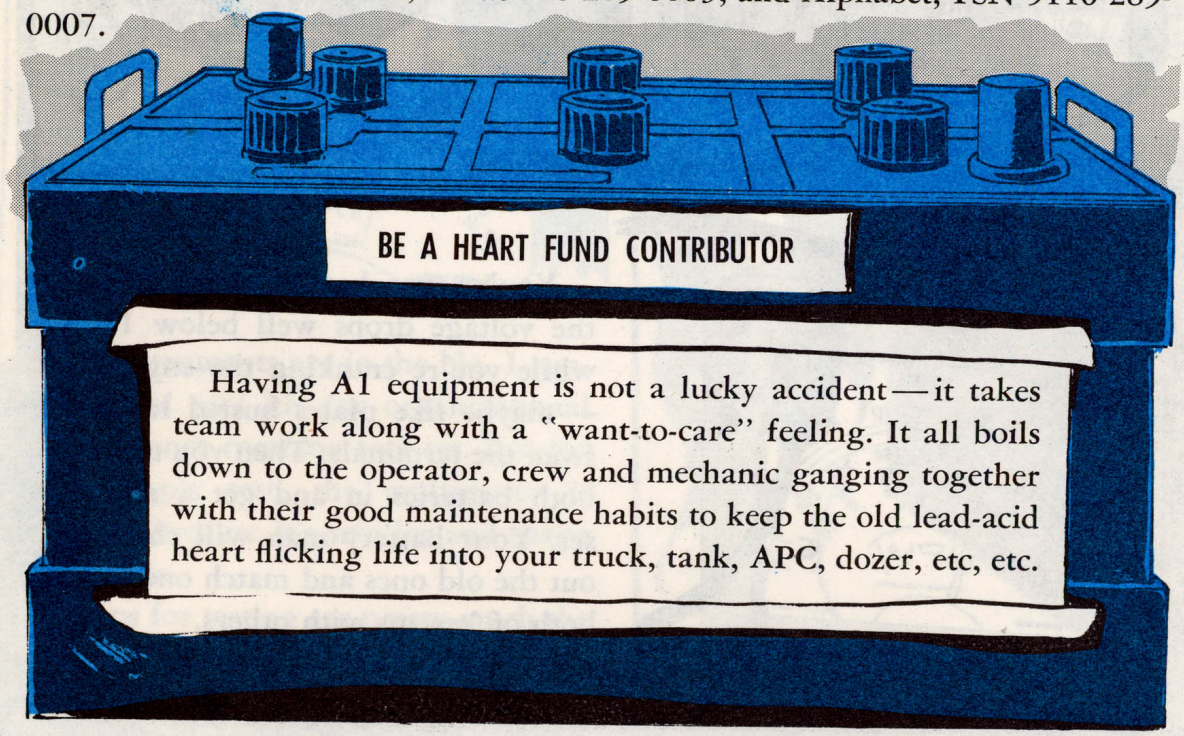
The telltale sign of unmatched batteries is when you find a variation of more than 25 specific gravity points or a difference of 0.2-volts or more between batteries. When you run across this condition take your batteries out and have your battery man match 'em according to paragraph 45 c. in TM 9-6140-200-15 (Jul 58).

Unmatched batteries is one big reason for a battery's early death.

SERVICING AND DATING

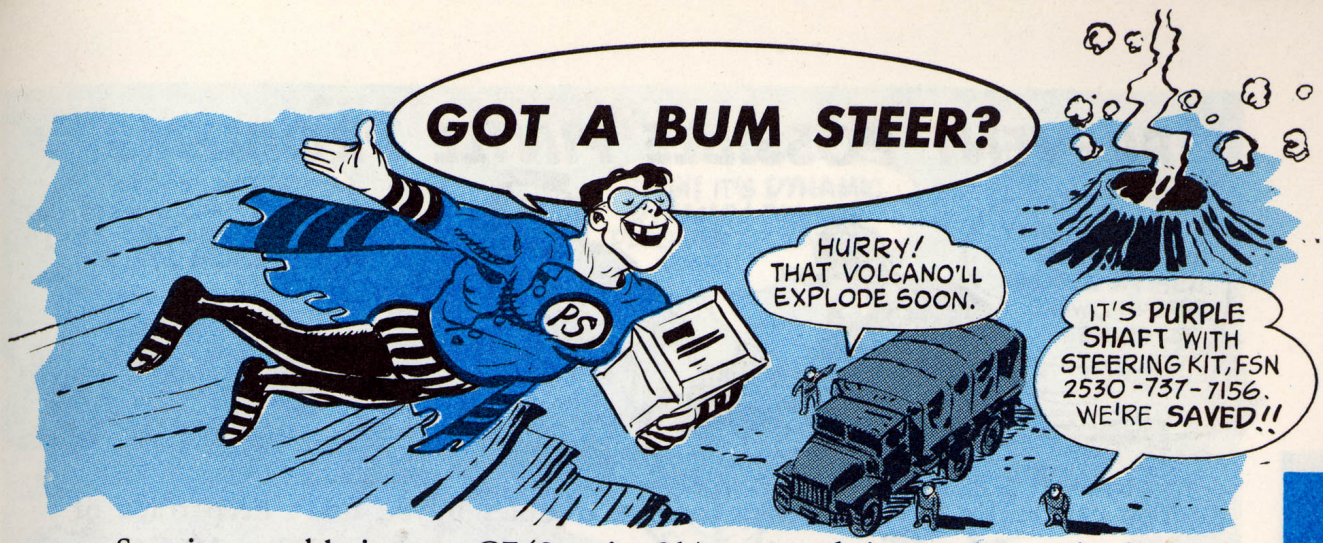
Whether your batteries last as long as they should may depend on whether they were given an initial charge before being put into service. Change 1 to TM 9-6140-200-15 strongly recommends initial charging and gives the steps to do this.

And every battery has to have a service date stamped on it. The "battery TM" gives the when and how on dating, too. Even tho a battery may come with an attached tag giving instructions for painting the service date on the battery, you don't use paint. You use the die stamps in your common tool set. They're Metal Die Sets, Numerical, FSN 5110-289-0003, and Alphabet, FSN 5110-289-0007.



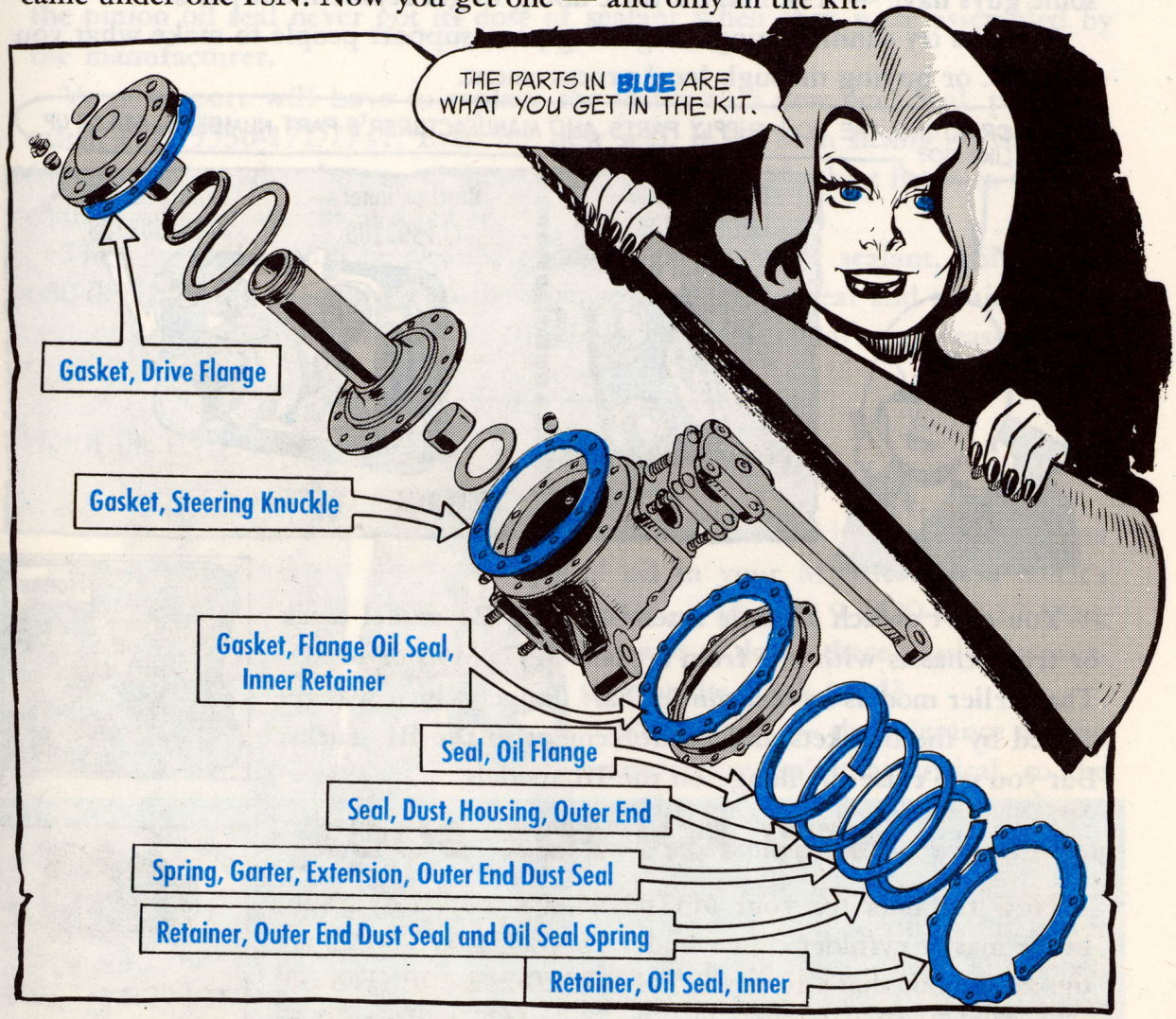
BE A HEART FUND CONTRIBUTOR

Having A1 equipment is not a lucky accident—it takes team work along with a "want-to-care" feeling. It all boils down to the operator, crew and mechanic ganging together with their good maintenance habits to keep the old lead-acid heart flicking life into your truck, tank, APC, dozer, etc, etc.



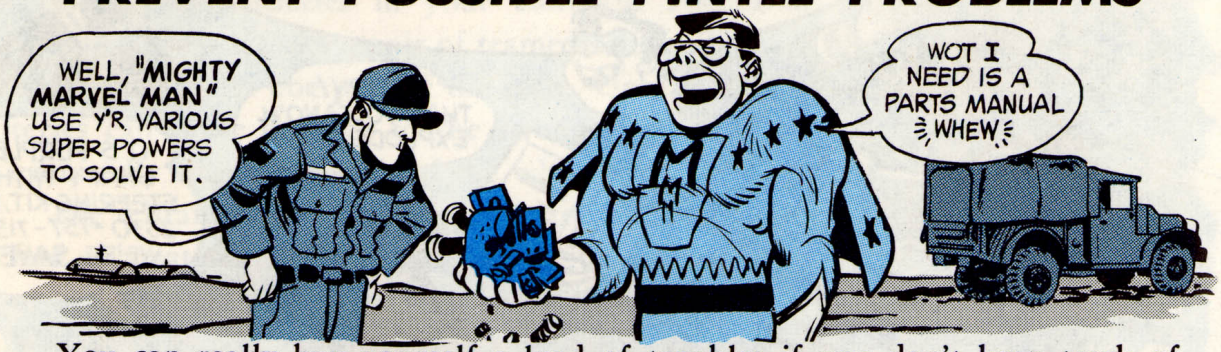
Steering trouble in your G749-series 2½-ton truck is not always the fault of the steering gear — but it could be. A good "truck doctor" can find out.

Some of the repair parts you once got separately now come in Parts Kit, Steering, FSN 2530-737-7156. Like the two steering knuckle gaskets, f'rinstance, that came under one FSN. Now you get one — and only in the kit.



The kit's listed in Federal Supply Catalog C2530-IL-A-CB3 (Jan 66).

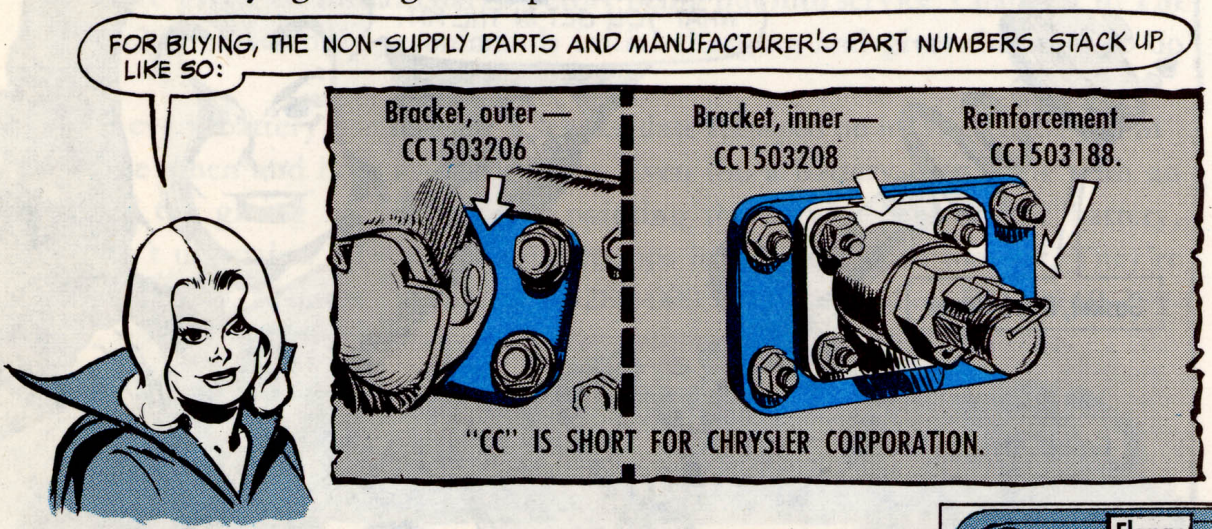
PREVENT POSSIBLE PINTLE PROBLEMS



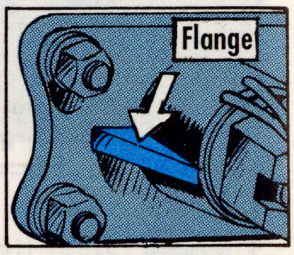
You can really buy yourself a load of troubles if you don't keep track of things when you take apart the pintle assembly on your M37B1, M56B1 or M201B1 ¾-ton truck or truck chassis.

Seems there're two brackets and a reinforcement on the pintle assemblies for these vehicles — and they're non-supply items. If you lose any of 'em — as some guys have — it can take a little doing to get replacement parts.

You can try cannibalizing . . . getting your support people to make what you need . . . or buying through local procurement.



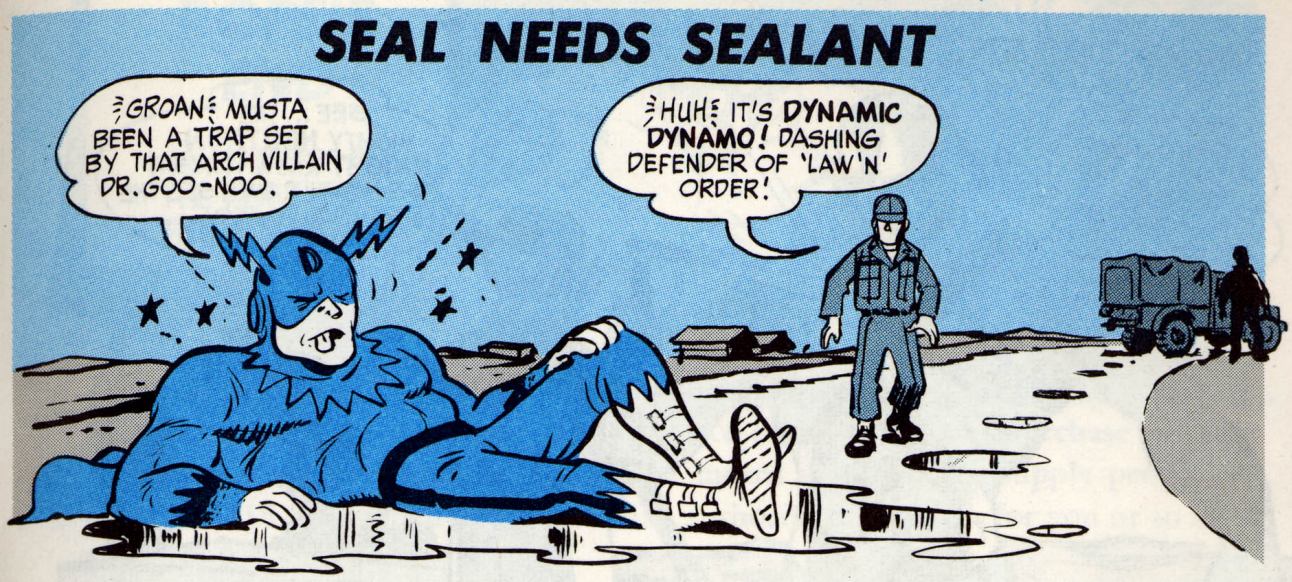
You can't switch a pintle assembly for a B1 model truck or truck chassis with one from a plain M37, M56 or M201. The earlier models have a pintle shaft flange, which was replaced by the brackets and reinforcement in the B1 trucks. But you can't use the flange on the B1 models.



NEW FSN FOR BOOT

Now the boot for your M37B1 ¾-ton truck's hydraulic brake master cylinder comes under FSN 2530-317-6078. It's the same boot that's listed in TM 9-2320-212-20P (Feb 60) with FSN 2530-391-0705. Use the new FSN and you'll be sure to get the right item.

SEAL NEEDS SEALANT



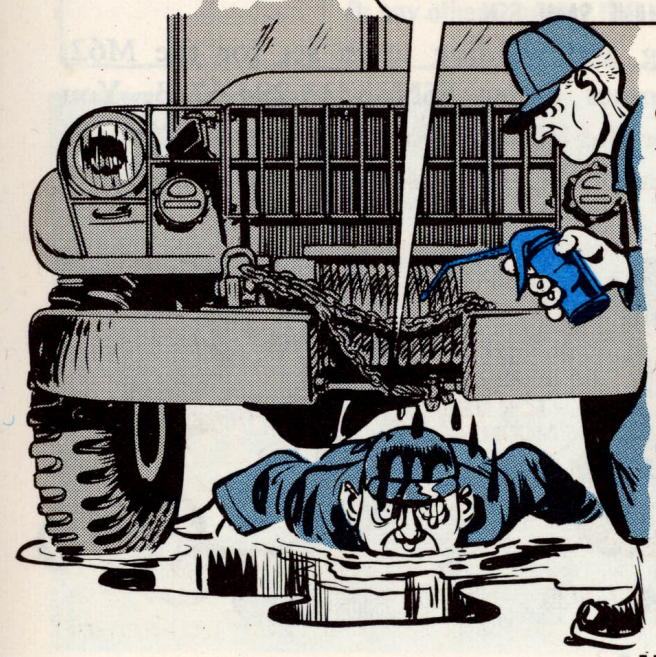
Oil leaking from the differential of your M37B1 ¾-ton truck may mean the pinion oil seal never got its dose of sealant when they were assembled by the manufacturer.

Your support will have to replace the seal with a new one: Seal, plain encased, FSN 5330-171-7741. Even the new seal, if it's been sitting on the shelf for a long time, may be one of those without sealant. The best bet is to take no chances and put sealant in anyway.

The new seal should be cleaned good. Then a coat of sealant, FSN 8030-680-0889, has to be applied on the surface between the seal and retainer. The sealant's supposed to set for about 20 minutes before the parts are reassembled.

WINCH OIL LEVEL . . .

ENUFF IS ENUFF



So how come when you put a quart of oil in your M37B1 ¾-ton truck's winch — like LO 9-2320-212-12 (Aug 64) says to do — there's quite an overflow at the check level?

No mystery — the tolerance during manufacture isn't that critical, so the capacity may be off an ounce or two. This goes for both the winch worm case and winch drum and shaft case.

So, when you're putting oil in either case, keep the level check hole open and put in just enough oil so it starts to run out the check hole. And no more.

DOCKSON TORCH SETS... TWINS - ALMOST

Some got the Model 4EC and some got the Model 5 Dockson cutting and welding torch set on their 5-ton wreckers.

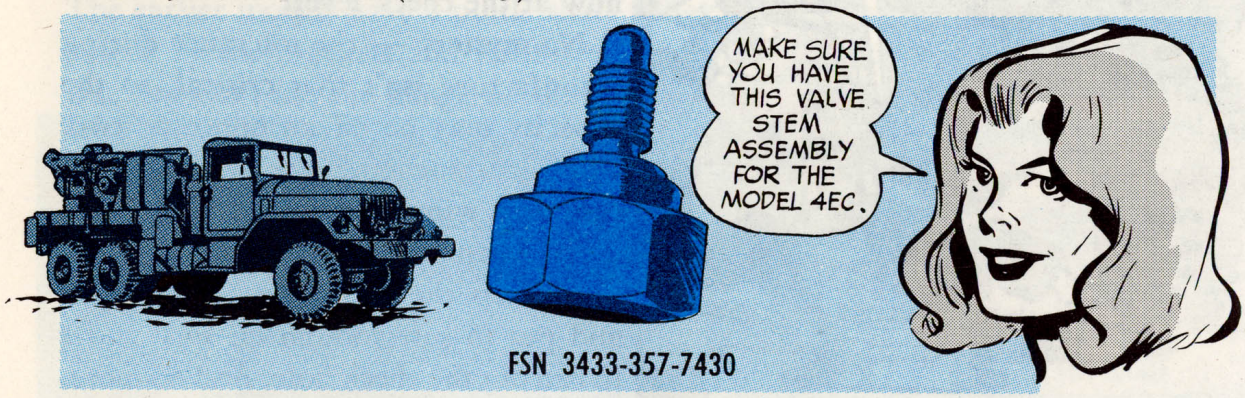
Torch tips and other replaceable parts — except one — are the same for both models. The exception is the Stem, Valve Assembly. It's FSN 3433-357-7430 for the Model 4EC. To get this part for the Model 5, order by Part Number 18075:58C — make sure you mention it's for the Dockson Model 5 set and note "No substitution."

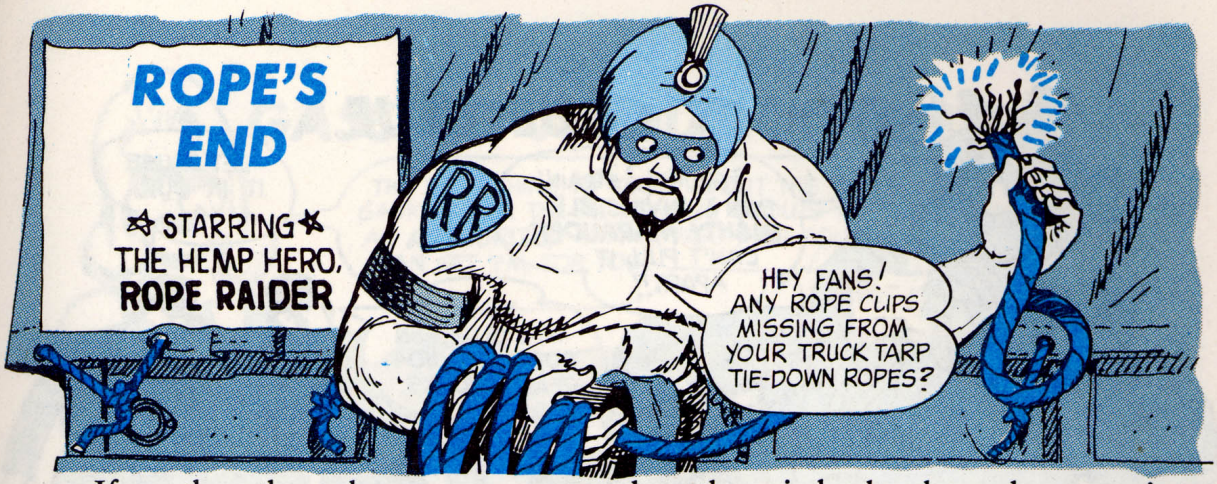
You can hardly tell the difference lookin' at 'em, unless you've got a late Model 5 set that has a spline-shaped valve stem handle instead of hex-shaped.

Except for that one part, the Model 4EC parts list (with FSN's) that appeared in PS 152 can be used for the Model 5, too.

FOUR SETS HAVE SAME FSN

A complete oxygen-acetylene cutting and welding torch set for the M62, M246, M543 or M543A2 wrecker comes under FSN 3433-294-6743. You might get either of the Dockson sets or the Victor set or the National Cylinder set. FSN's for parts in the Victor and National Cylinder sets are listed in Change 3 to TM 9-2320-211-10 (Mar 63).





If so, then the only way you can replace them is by local purchase — since they are not in the supply system. That means your support supply people can use AR 715-30 as their local purchase authority to buy 'em for you or to stock the country store.

This metal ferrule, or tip, is commercially known as "Clip, rope binding, single type" and is the preferred item for all your truck tarp tie-down ropes. The old method of whipping free rope ends to keep the strands from unraveling with waxed thread or cord is OK. But thread or cord unravels too fast when the rope flaps in the wind.

Tape soon loses its stick-to-it qualities during outdoor use, and whipping with wire cuts your hands. So the metal clip is your best replacement item.

The source of supply for the clips is the nearest distributor for any of these companies:

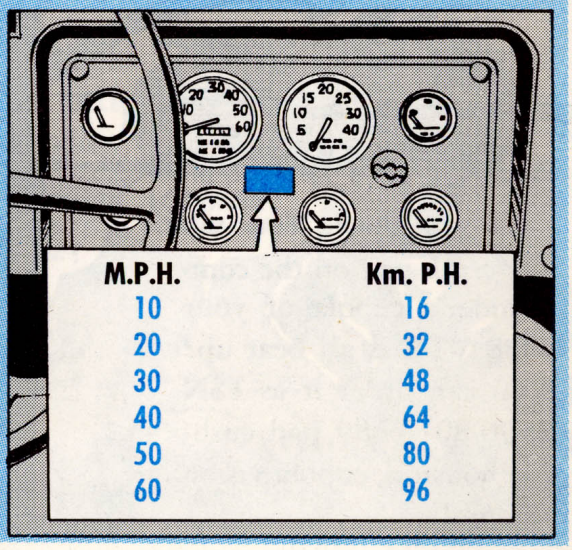
Manufacturer	Part Number
Monadnock Mills, San Leandro, Calif.	295789
Freuhauf Trailer Co., Detroit, Mich.	326240
Red Motors, Inc., Detroit, Mich.	7979452

Or any other company that may have an "or equal" clip.

MPH VS KmPH

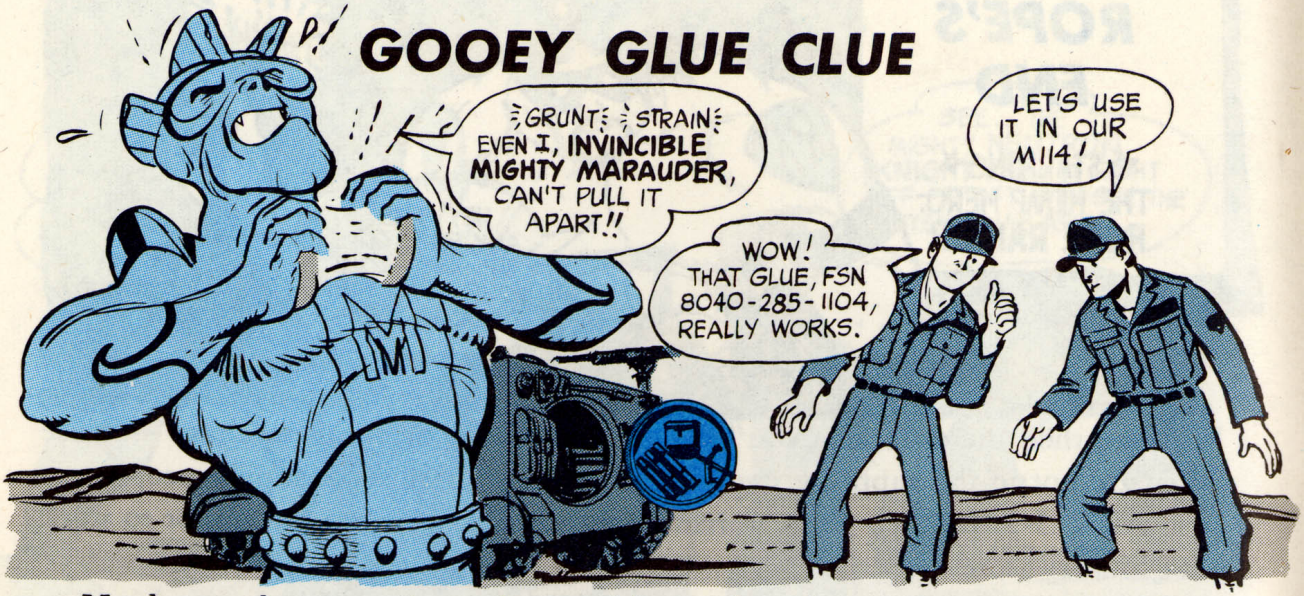
Kinda important you know how to marry up miles per hour and kilometers per hour if the speedometer on your vehicle reads in MPH and all the local signs are in KmPH — as they are sure to be almost every place but the good ol' USA.

TB ORD 653 (Sep 56) says to put the figures on a piece of gummed, waterproof paper and stick the paper on the instrument panel near the speedometer.



M.P.H.	Km. P.H.
10	16
20	32
30	48
40	64
50	80
60	96

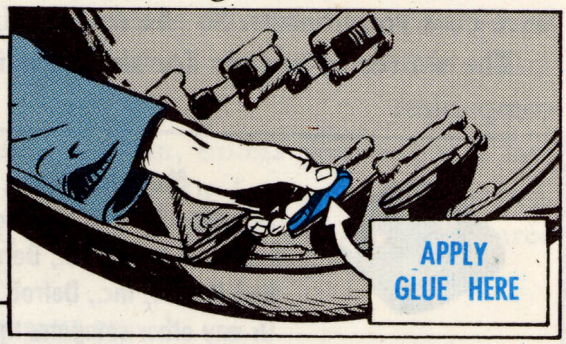
GOOEY GLUE CLUE



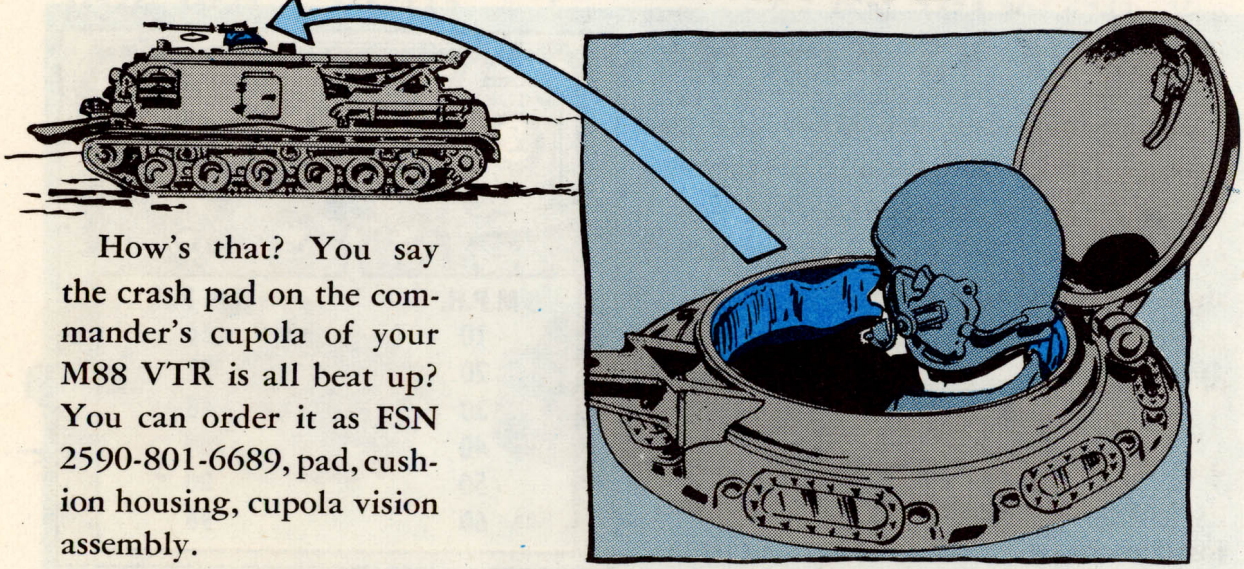
Need a good, gooey glue to keep rubber pads and seals in place on your tank or personnel carrier? Well, there's one listed on page 81 of Federal Supply Catalog C8000-IL-A (Jan 66).

It's resistant to oil and water (but not to fuel) and will bond either natural or synthetic rubber. Don't order more than you'll need for a three-month supply because it loses its stick if it sticks around too long before it's used.

FSN 8040-062-6953	½ ounce tube
FSN 8040-285-1104	1 pint bottle
FSN 8040-664-4318	1 pint can (Also GSA Item)
FSN 8040-290-4301	1 quart can (Also GSA Item)

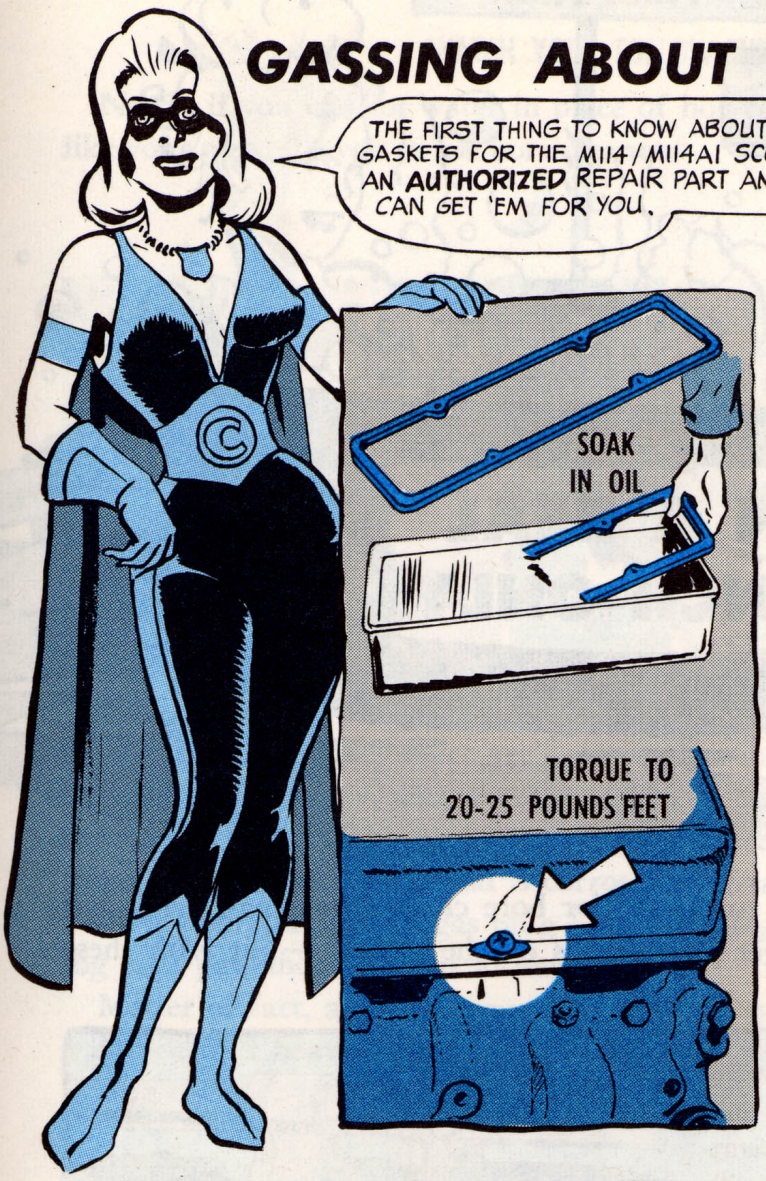


M88 VTR CRASH PAD



How's that? You say the crash pad on the commander's cupola of your M88 VTR is all beat up? You can order it as FSN 2590-801-6689, pad, cushion housing, cupola vision assembly.

GASSING ABOUT GASKETS



Have your support order gasket, valve rocker cover, FSN 2805-828-3683. It's Item 4, page 183 of TM 9-2805-220-35 (Dec 64), and the part number is 11862-3824007.

The next thing to know about these gaskets is that they should be soaked in oil before you put 'em on. The oil swells them up and makes them work better.

The third thing to know is that the machine screws on the valve covers shouldn't be too tight or they'll over-compress the gaskets. Make 'em snug as a bug but too tight is not bright.

The correct torque is 20 to 25 pounds feet like it says on page 165 of TM 9-2805-220-35 (Dec 64).

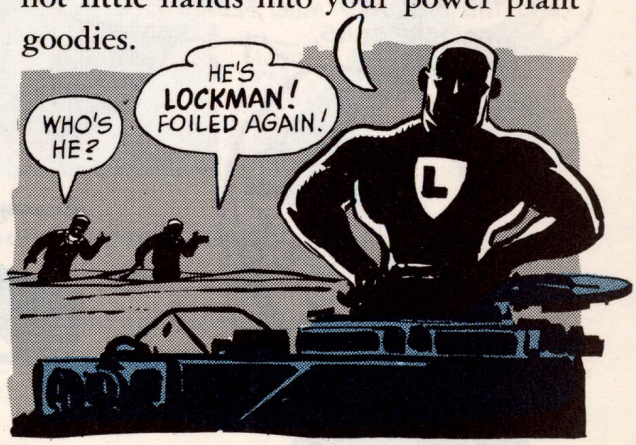
M113 COMBAT LOCK LOCATION

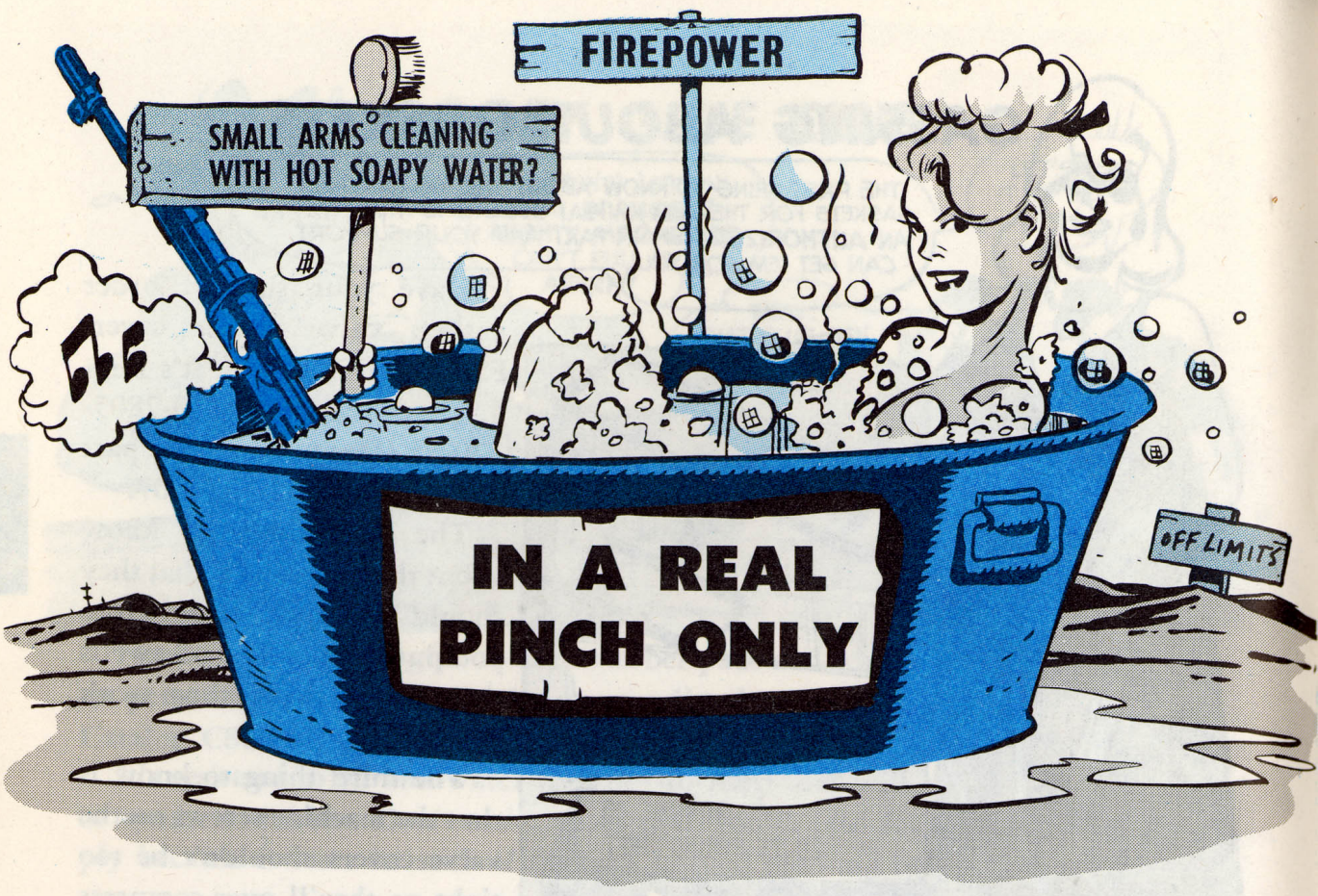
The interior combat lock for the power plant door on your M113 family of vehicles is real safety insurance . . . so why doesn't everybody use it?

Well, some drivers forget it's there, even though it's shown on page 25, Fig 24(c) of TM 9-2300-224-10 (Nov 61).

Just reach around the corner from your choke and throttle controls and you'll find the lock behind the wires.

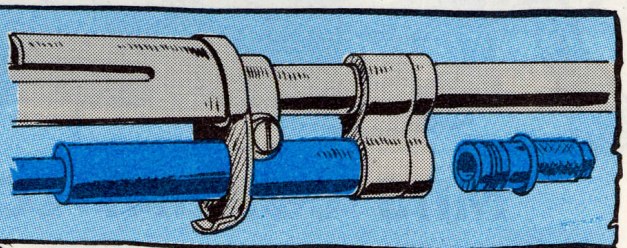
Keep the door locked from the inside and you'll have no worries about midnight requisitioners getting their hot little hands into your power plant goodies.

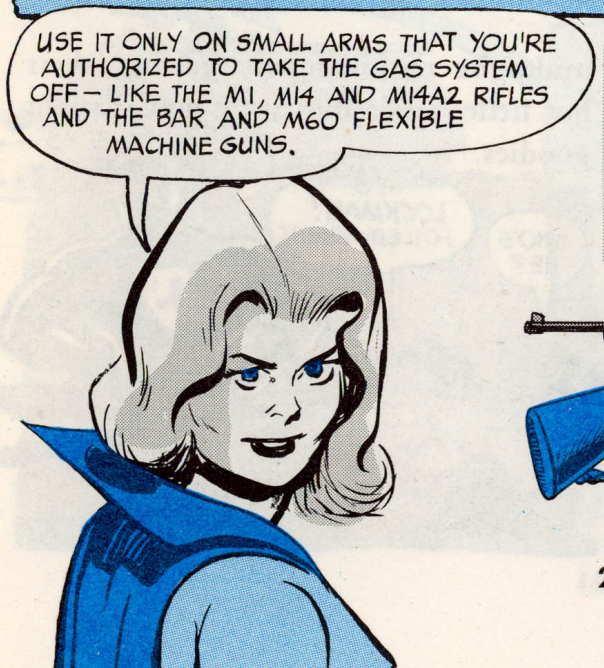




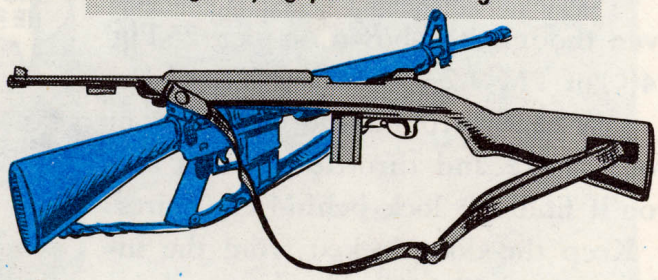
Hot, soapy water is no real substitute for bore cleaner for small arms, but it can be used if you can't get your hands on the cleaner—but with these restrictions:

Be sure you get rid of all traces of moisture in the bore and chamber—and **especially the gas system**—afterwards. Otherwise your weapon'll come down with a bad case of rustitis.



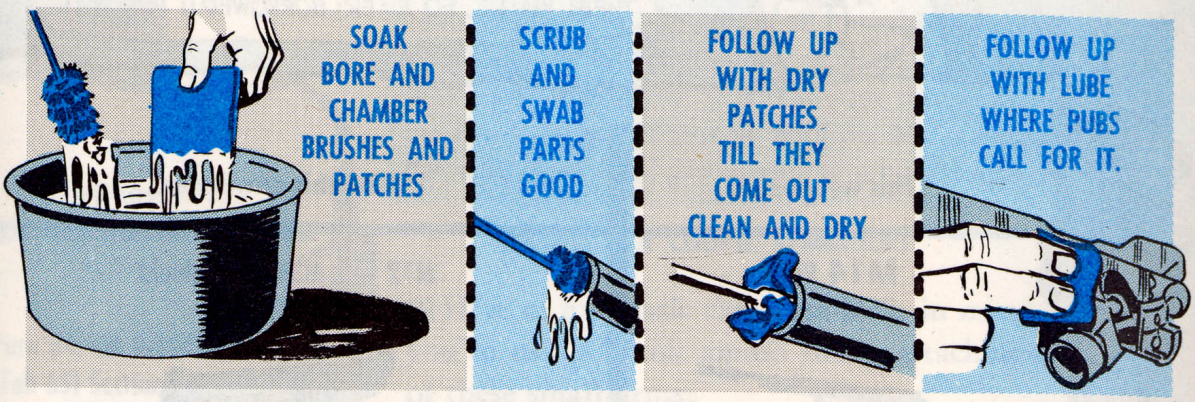


Never use it on the M1 carbine—where you're not authorized the tool to remove the gas piston—or the XM16 or XM16E1 rifle—where it's impossible to do a real thorough drying job inside the gas tube.



WATCH YOUR FOLLOW-THROUGH

Natch, if you use hot water in place of bore cleaner, you use the water just like your pub tells you to use bore cleaner.



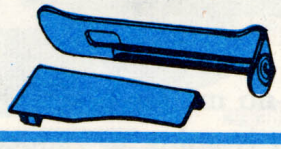
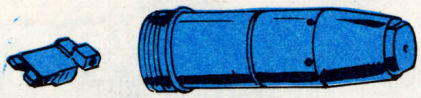
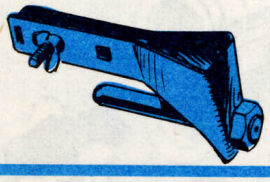
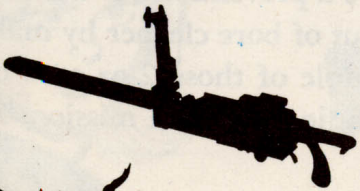
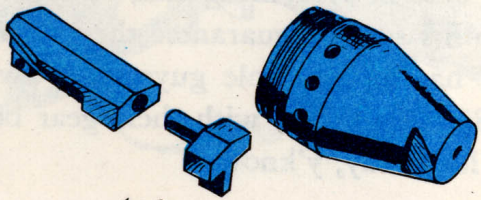
Now, no matter how careful you are shoving a wet patch through the bore, the patch is going to "squee-gee" some water into the gas system. And no matter how hard you try, you're not going to be able to drain all of the moisture out again. Result: The water that stays in there is going to cause trouble even though the gas system's metal is corrosion-resistant.

That's why taking the gas plug off and taking the gas system apart and drying each part thoroughly is so important.

Matter of fact, any time your weapon's gas system gets real wet—like from a dunking or heavy rain or fog—you want to take it apart and give it the drying routine. Just like your pubs say.

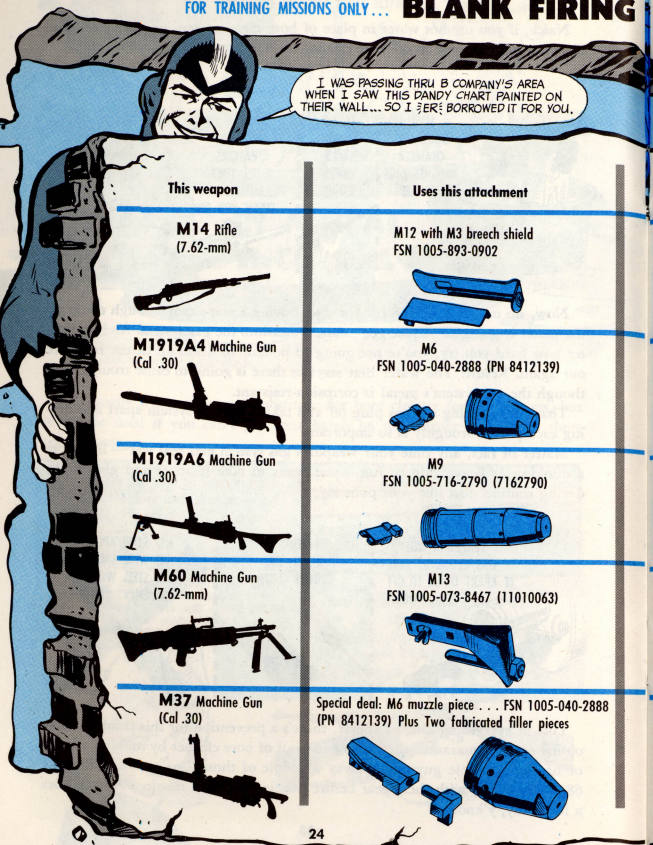
Like in everything else, of course, there's a prevention for this trouble. Some outfits sort of guarantee they won't run out of bore cleaner by making a habit of having a couple guys stash away a couple of those 2-oz cans of CR (FSN 6850-224-6656) with their gear before heading out on a mission. A little goes a long way, y'know.

FOR TRAINING MISSIONS ONLY... BLANK FIRING

This weapon	Uses this attachment
M14 Rifle (7.62-mm)	M12 with M3 breech shield FSN 1005-893-0902 
M1919A4 Machine Gun (Cal .30)	M6 FSN 1005-040-2888 (PN 8412139)
M1919A6 Machine Gun (Cal .30)	M9 FSN 1005-716-2790 (7162790) 
M60 Machine Gun (7.62-mm)	M13 FSN 1005-073-8467 (11010063) 
M37 Machine Gun (Cal .30) 	Special deal: M6 muzzle piece . . . FSN 1005-040-2888 (PN 8412139) Plus Two fabricated filler pieces 

FOR TRAINING MISSIONS ONLY...

BLANK FIRING ATTACHMENTS



This weapon	Uses this attachment	Like it says in . . .
M14 Rifle (7.62-mm)	M12 with M3 breech shield FSN 1005-893-0902	Para 84, TM 9-1005-223-12 (Feb 65) Section XV
M1919A4 Machine Gun (Cal .30)	M6 FSN 1005-040-2888 (PN 8412139)	Para 3, Appen. IV, FM 23-55 (Oct 55) TM 9-1005-212-12P (Jul 64) TB ORD 688 (24 Jun 57)
M1919A6 Machine Gun (Cal .30)	M9 FSN 1005-716-2790 (7162790)	FM 23-55 (Oct 55) TM 9-1005-212-12P (Jul 64) TB ORD 688 (24 Jun 57)
M60 Machine Gun (7.62-mm)	M13 FSN 1005-073-8467 (11010063)	TM 9-1005-224-12 (Oct 63) w/ Changes
M37 Machine Gun (Cal .30)	Special deal: M6 muzzle piece . . . FSN 1005-040-2888 (PN 8412139) Plus Two fabricated filler pieces	

Before you can rig your M37 with a blank firing attachment, your unit has to request approval from your Army Headquarters. Then your unit sends this approved request to the Army Weapons Command, Rock Island Arsenal, Illinois, which in turn will furnish complete dope for developing the M37 BFA. The gist of it is that your direct support'll make the two filler pieces that go with the M6 muzzle piece. Incidentally, these filler pieces are for lefthand feed only.

A COUPLE REMINDERS

Here're five basic things to keep in mind whenever you're using blank ammo firing attachments on any of these small arms:

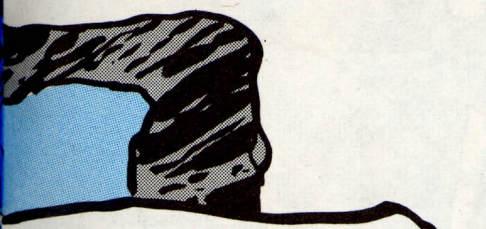
1. Be careful when putting the attachment on or off that you don't hurt the parts of your weapon.
2. Never try to use the muzzle attachment unless the cartridge stop attachment's in its proper place in the feedway.
3. Always remove the muzzle attachment before removing the cartridge stop attachment. This'll eliminate any chance of firing live ball ammo with the muzzle attachment in position.
4. Before firing, make sure the muzzle attachment's clean inside.
5. After firing, clean the barrel real good to get rid of carbon build-up. And make sure you do this cleaning bit before firing any other type of ammo.

M73 MACHINE GUNNERS!

If you have a blank firing attachment (FSN 1005-973-4001) for your M73 machine gun, don't use it. Turn it in pronto.

The gizmo's been tried and found wanting . . . causes fast carbon buildup, ejection troubles, mucho woe. In a nutshell, these BFA's are no longer authorized . . . and they're not available. OK?

ATTACHMENTS



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Para 84, TM 9-1005-223-12 (Feb 65) Section XV

Para 3, Appen. IV, FM 23-55 (Oct 55) TM 9-1005-212-12P (Jul 64) TB ORD 688 (24 Jun 57)

FM 23-55 (Oct 55) TM 9-1005-212-12P (Jul 64) TB ORD 688 (24 Jun 57)

TM 9-1005-224-12 (Oct 63) w/ Changes

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No sweat keeping oil in the recoil mechanism of your towed, self-propelled or tank-type cannon when you've got the exact oil on hand that your LO calls for, right?

But, how about when your system craves fluid and you only have a type handy that the LO doesn't mention?

Now that TB ORD 586 is a has-been and a lot of LO's are changed, a little chat on this might be helpful.

First off, things'll never get too sticky if you keep one basic idea in mind . . . OHC, OHA and RS are the **only** recoil oils that any recoil mechanism can stomach. This goes for both hydropneumatic and hydrospring types.

Any other oil is strictly poison—under any circumstances—jawohl!

So-o-o-o . . . !

All three of these acceptable oils are petroleum-base mineral oils that're made especially for recoil mechanisms. But there're some differences which make one better than another in different situations.

*WHO, IN REALITY IS THE MILD-MANNERED K.P. BRENT ZARK, PVT-E2

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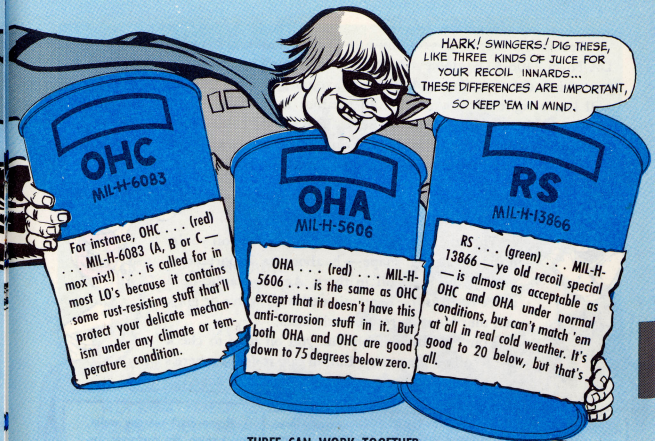


THREE CAN WORK TOGETHER—

Now, since these three—OHC, OHA and RS—are all petroleum-base mineral oils, they are compatible, which means that in a pinch you could use one in place of another or mix 'em.

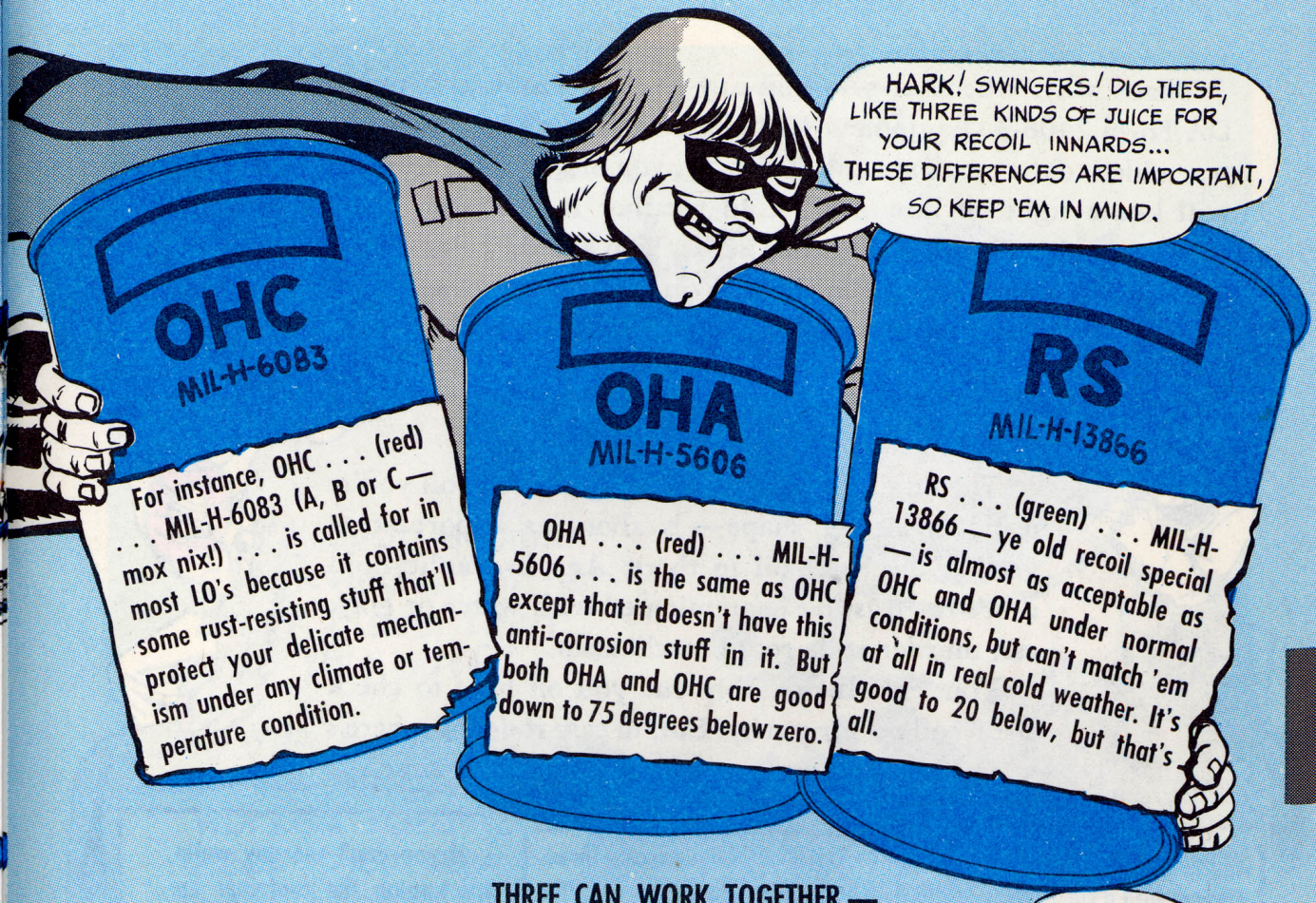
For example, if an LO change comes along calling for OHC and you have OHA or RS in the mechanism—**and this oil's in good shape**—leave it be. Nobody'd expect you to waste good hydraulic fluid just 'cause it's not OHC.

You can get in line with the LO after your present supply of OHA or RS runs out. Provided, of course, you're operating in an area where you don't absolutely need OHC on account of the climate or temperature. Your maintenance officer'll decide this for you.

Or, suppose you're stuck off somewhere and the oil index shows your reserve is low . . . and you don't have any more of the same kind of oil handy. In a case like this, go ahead and add any of these—OHC, OHA or RS. You can leave the mixture in there till the next change's due, too, as long as the fluid's not contaminated and the weapon recoils OK.

But, here again, you want to keep the temperature in mind. Any mixture with RS in it won't stand up against real cold weather the way pure OHC or OHA will.

MORE



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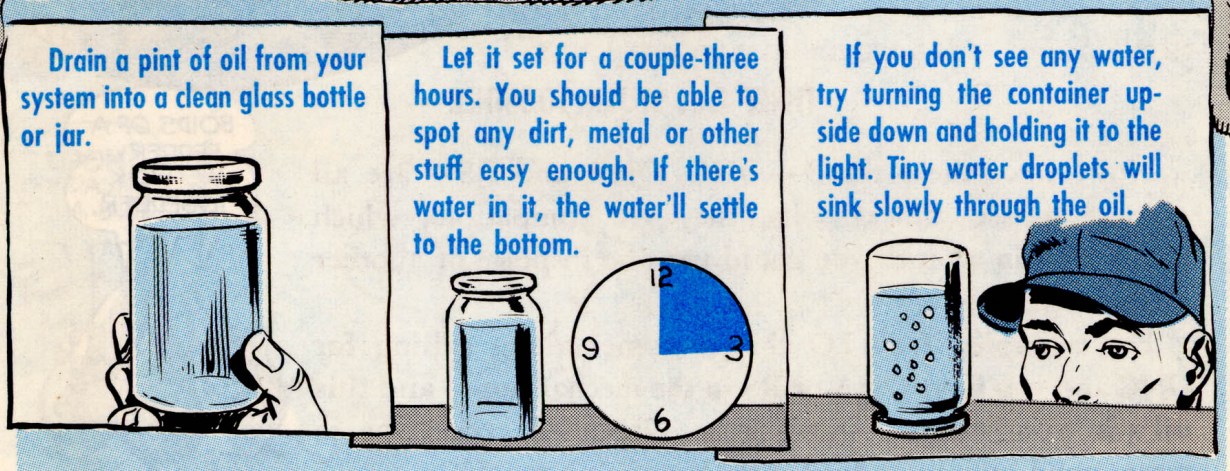
PS MORE

That's why, whenever you mix any of these fluids, always jot down on your DA Form 2408-3 (Equipment Maintenance Record) how many quarts or gallons you added to the recoil system. This way, you or any other guy using the weapon will know right off how much cold weather it can take without developing recoil trouble. TB ORD 586 used to say you should color code the filler plugs to show what type of oil's in there. You can throw away the paint pot now, though, since you keep this information in your log book.

CHECK YOUR OIL—

The other big point—making sure the oil you're using is in A-1 shape—is about as important as getting the right oil in there. Any hydraulic fluid that's the least bit contaminated with water or gook can murder your recoil mechanism.

Your TM'll probably cue you on how to check the recoil oil for purity. But, in case it doesn't, here's a simple naked-eye test you can make any time.



This test'll do it for you most times. But, if you suspect water or dirt is in there and you still can't find it, let your support people have a try at it.

Once you find there's contamination in the oil, don't waste a minute. Get hold of your support guys who will drain the system, flush it out and re-fill it for you with good clean fluid of the right type.

Of course, the best deal is to make sure no moisture or dirt gets in the recoil oil in the first place. This means, among other things, keeping the oil container covered tight and away from real hot heat . . . keeping the filler plugs and servicing equipment spotless clean . . . and such-like.

Just bear in mind that your recoil mechanism needs a certain kind of fluid diet—and that this fluid's got to be wholesome and pure.

A weapon with a pain in the recoil system is a real pitiful sight to behold.

JOE'S DOPE

HOW "FREE" the TURN-IN

Once upon a time, stationed in a far-away place, there was this outfit.

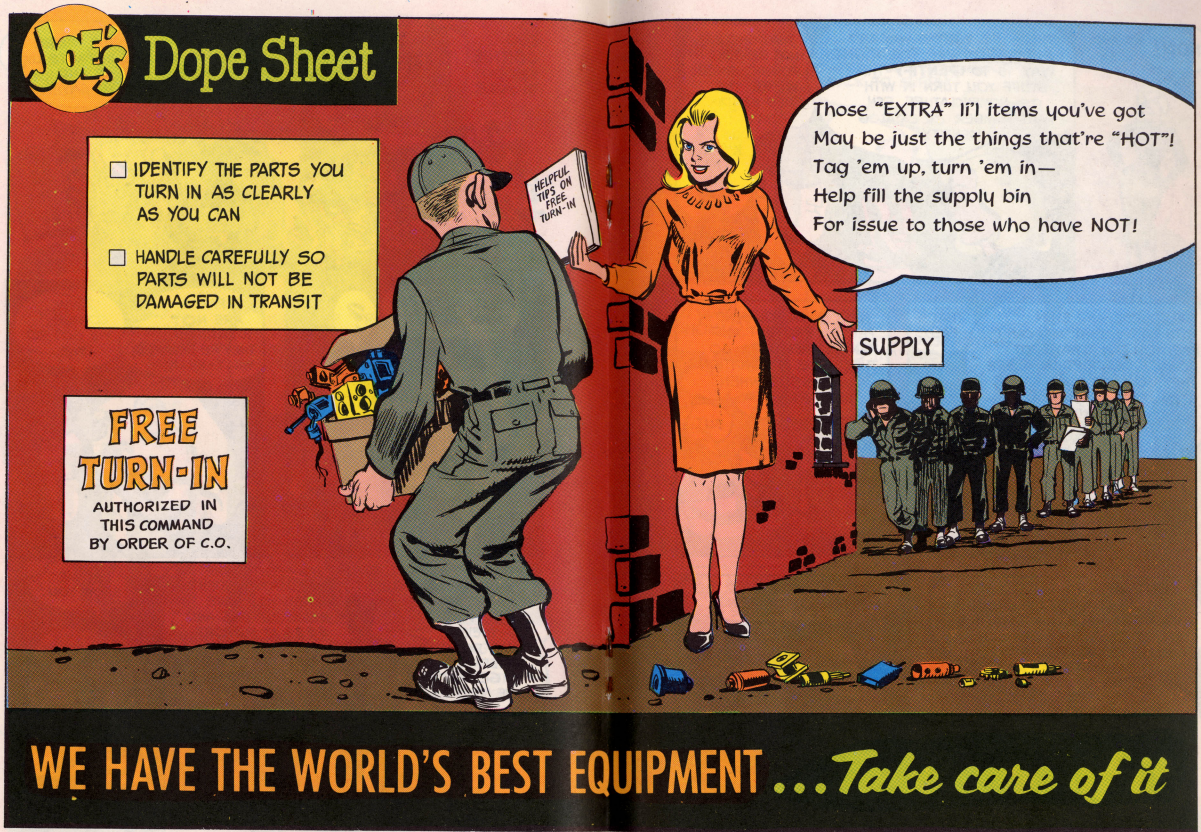
It was a very good outfit and they worked hard to keep their equipment ready to **GO** at any moment. They did this by good operation, careful maintenance, and cozy supply... and besides, they were authorized free turn-in.

But one day things began to go wrong... and then they heard their supply support groan.

WHAT IS YOUR PROBLEM ?!
...asked CONNIE RODD, who just happened to be there this day!
WE'RE GETTING HARDENING OF THE SUPPLY ARTERIES AND CANNOT KEEP THE FLOW GOING!!!
Said the Supply type, sadly.
YOU SEE?!
Said he, showing CONNIE his work shop.
EVERY TIME "FREE TURN-IN" TIME HITS, WE GET MURDERED!... I GOT FIFTY MEN DOIN' NOTHING BUT SORTING STUFF THAT COMES TO US UNIDENTIFIED AND WE'RE 30 DAYS BEHIND SCHEDULE!
BUT ISN'T FREE TURN-IN COMMAND SOP... 'CAUSE IT SAVES SUPPLIES, TIME, MONEY AND MANPOWER? AND ISN'T IT YOUR JOB TO SORT AND RE-CHANNEL FREE TURN-IN SUPPLIES?
she asked.
SURE
...he said.
BUT DUMPING UNIDENTIFIED ITEMS ON US DOUBLES THE WORK LOAD AND SLOWS THE WORKS UP-AND-DOWN THE LINE!!

So, CONNIE SET OUT TO HELP...
FREE TURN-IN TODAY
HOLD ONE, SARGE... WHAT GIVES HERE?
HYA, CONNIE, WE'RE TURNING IN PARTS LIKE AR 735-35 AND AR 711-16 SAY!!!
MAINT. SHOP 1ST OF THE 1ST
BUT, HOW?? MAN, HOW!!
?
PARTS ARE NOT IDENTIFIED... THEY'RE DUMPED, WILLY-NILLY!
AWW... CONNIE, WE GOT NO TIME.
WHY, MY BOYS SPEND A BIG PART OF THEIR TIME DOIN' PAPERWORK TO GET PARTS WE NEED.
THAT'S JUST THE POINT!! THE MOMENT IT TAKES YOU TO IDENTIFY AN ITEM WILL SAVE BEAUCOUP TIME AND $$$$ AT SUPPORT AND YOUR HELP WILL GET THE ITEM BACK INTO THE SUPPLY SYSTEM PRONTO.
LET ME SHOW YOU!

IF YOU WANT TO DISPLAY THIS CENTERPIECE ON YOUR BULLE

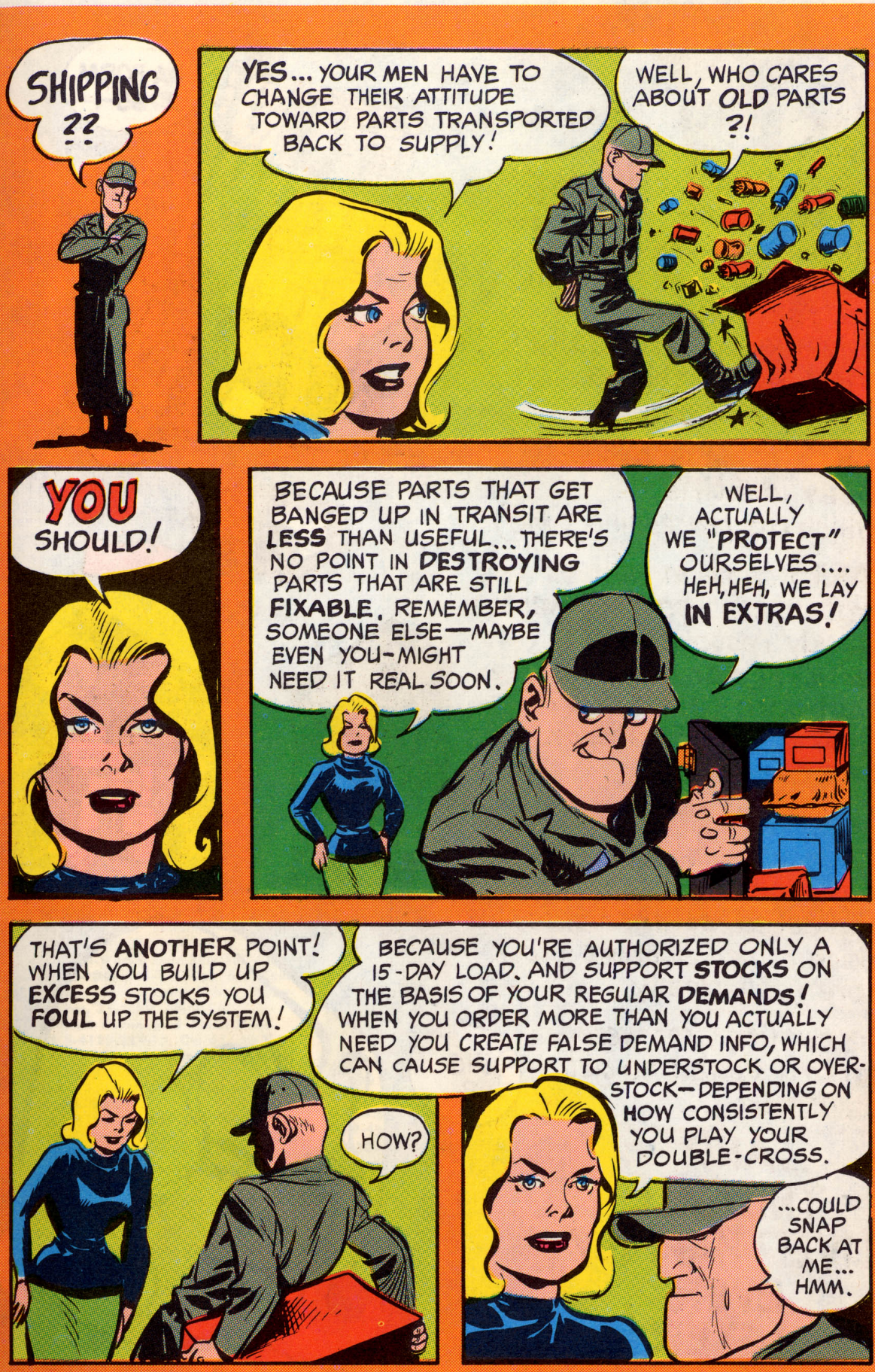


IF YOU WANT TO DISPLAY THIS CENTERPIECE ON YOUR BULLETIN BOARD, OPEN STAPLES, LIFT IT OUT AND PIN IT UP.

UIPMENT . . . *Take care of it*

LETIN BOARD, OPEN STAPLES, LIFT IT OUT AND PIN IT UP.

NOW!
...She said
THERE IS A WRONG WAY AND A RIGHT WAY... THE RIGHT WAY IS TO IDENTIFY THE STUFF YOU TURN IN WITH ITS NOMENCLATURE, FSN, PART NUMBER OR CATALOG IDENTITY!
THAT SHOULD NOT BE TOO ROUGH... SINCE WE'RE THE ONES SENDIN' 'EM IN... WE OUGHTA KNOW WHAT THEY ARE!
OF COURSE, AND EVEN WITH PARTS THAT YOU CAN'T PEG, YOU CAN ALWAYS JOT DOWN A DESCRIPTION, WHERE THEY GO... OR WHAT MAJOR ITEM THEY BELONG WITH! ANYTHING THAT'LL CLUE THE SUPPLY FOLKS.
THAT'S EASY.
NEXT, WHEN YOU SEND IN PARTS... PROTECT AND HANDLE THEM WELL, SO THEY'LL BE IN CONDITION TO REISSUE WHEN THEY ARRIVE!
BUT...
...BUT-ME-NO-BUTS... YOU KNOW THAT A LOT OF TURN-INS ARE REUSABLE... AND WITH A FIX OR TWO, THEY CAN GO RIGHT BACK INTO THE SYSTEM!
AND THIS BRINGS UP THE MATTER OF SHIPPING.


SHIPPING ??
YES... YOUR MEN HAVE TO CHANGE THEIR ATTITUDE TOWARD PARTS TRANSPORTED BACK TO SUPPLY!
WELL, WHO CARES ABOUT OLD PARTS ?!
YOU SHOULD!
BECAUSE PARTS THAT GET BANGED UP IN TRANSIT ARE LESS THAN USEFUL... THERE'S NO POINT IN DESTROYING PARTS THAT ARE STILL FIXABLE. REMEMBER, SOMEONE ELSE—MAYBE EVEN YOU-MIGHT NEED IT REAL SOON.
WELL, ACTUALLY WE "PROTECT" OURSELVES.... HEH, HEH, WE LAY IN EXTRAS!
THAT'S ANOTHER POINT! WHEN YOU BUILD UP EXCESS STOCKS YOU FOUL UP THE SYSTEM!
HOW?
BECAUSE YOU'RE AUTHORIZED ONLY A 15-DAY LOAD. AND SUPPORT STOCKS ON THE BASIS OF YOUR REGULAR DEMANDS! WHEN YOU ORDER MORE THAN YOU ACTUALLY NEED YOU CREATE FALSE DEMAND INFO, WHICH CAN CAUSE SUPPORT TO UNDERSTOCK OR OVER-STOCK—DEPENDING ON HOW CONSISTENTLY YOU PLAY YOUR DOUBLE-CROSS.
...COULD SNAP BACK AT ME... HMM.

And so, after this was explained and, they realized that fair play and teamwork were desperately needed... And, that free turn-in isn't for kicks and convenience... it really saves skin... things began to change!

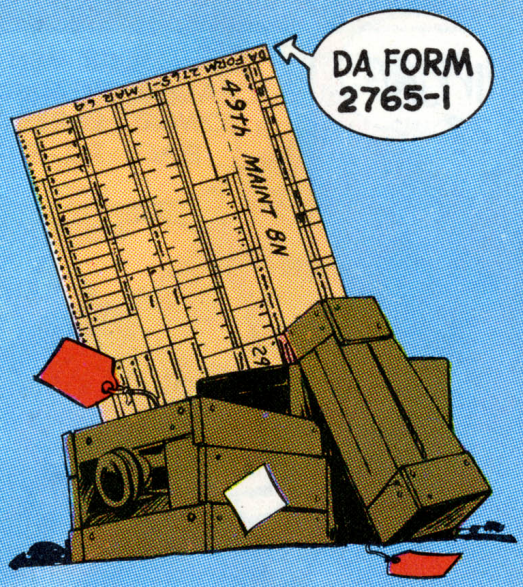
PARTS came into supply easily identified. (which cut processing time)

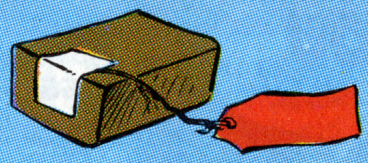
PARTS came in well protected... so they were quickly restored to service. (many had not even been taken out of their original waterproof packages.)

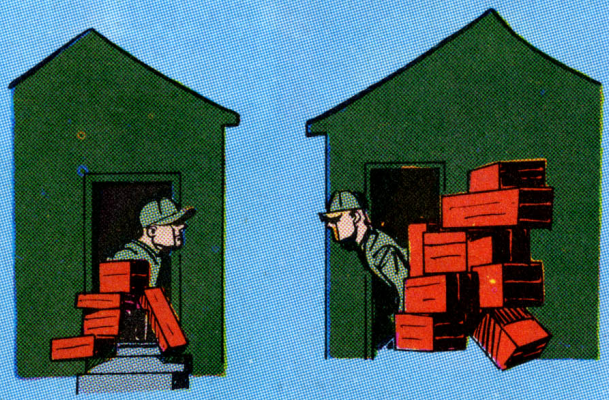
And, outfits that had too much of an item **SENT** in their excess and requested actual needs. Which helped support stock more realistically.

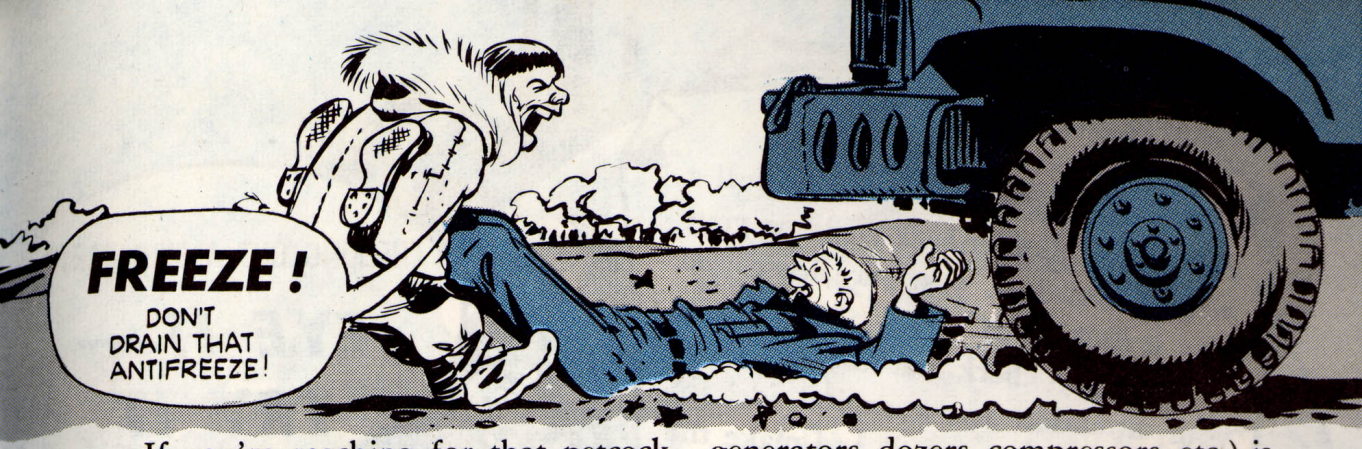
So, outfits that were hurting began to get their parts...

...AND THEY ALL LIVED HAPPILY EVER AFTER!









If you're reaching for that petcock or plug to drain your antifreeze—freeze!

Tactical Equipment—If yours is a "combat-ready" piece of equipment there should be a fresh supply of antifreeze on hand or within reach to protect it for temperatures between + 32° and − 55° F. If it's not don't drain the antifreeze that's already in your equipment's cooling system.

The latest word on antifreeze for tactical equipment (trucks, carriers, generators, dozers, compressors, etc.) is in TB Ord 651 (Aug 64).

Although you normally have your equipment's cooling system protected only to the maximum low temperature for your area, you may be called in a hurry to go someplace where the mercury hits 55° below.

Administrative Vehicles—With these jobs you do like TM 38-660-2 (Aug 59) says . . . drain antifreeze only when it shows signs of being contaminated.

A selected list of recent publications of interest to Organizational Maintenance Personnel. This is a list compiled from recent Adjutant General's Distribution Center Bulletins. For complete details see DA Pam 310-4 with latest changes.

TECHNICAL MANUALS

TM 1-1U-1A-520, C2, Jan 66, (U-1).
TM 3-1040-204-14, Nov 65, Flamethrower, Portable M2A1-7.
TM 3-1040-244-20P, Dec 65, Compressor, Recip, Power-Driven Flamethrower, 3½ CFM, AN/M4/C (Stewart-Warner Mod 3260101-6).
TM 3-1040-244-12, Dec 65, Compressor, Recip, Power-Driven Flamethrower, 3½ CFM, AN/M4/C (Stewart-Warner Mod 3260101-6).
TM 5-4120-229-15, Oct 65, Air Conditioner Mtd; Air Cooled Electric Motor Driven; AC 115V, Single Phase 60, Cycle; 9,000 BTU/HR (Redmanson Mod A-9000).
TM 5-6115-247-20P, Jan 66, Gen Set, Diesel Eng: 45KW, AC, 120/208, 240/416 V, 3 Phase 50/60 Cycle: Skid Mtd; Winterized (Stewart & Stevenson Mod 54400).
TM 5-6115-340-15, Nov 65, Gen Set, Gas Eng Driven, 5 KW, AC, (HOLGAR Mod CE-57-400 AC).
TM 9-1290-326-12, Nov 65, AN/GSQ-64 Signal Data Repro.
TM 9-1410-500-15P/1, Nov 65, Hawk (USAR: None).
TM 9-1410-501-15P, Nov 65, Hawk (USAR: None).
TM 9-1430-250-15P/6/1, Dec 65, Nike-Herc (Imp).
TM 9-1430-250-15P/20/2, Nov 65, Nike-Herc, Nike-Herc (Imp).
TM 9-1430-250-15P/20/1, Nov 65, Nike-Herc
TM 9-1430-377-12P/1, Nov 65, Pershing.
TM 9-1430-377-15P/2, Dec 65, Pershing (USAR: None).
TM 9-1440-250-10/1, Nov 65, Nike-Herc, Nike-Herc (Imp) (USAR: None)
TM 9-1450-250-15P/4/1, Dec 65, Nike-Herc, Nike-Herc (Imp).
TM 9-2300-224-10/2/1, C2, Dec 65 (U), Operator, M113A1.
TM 9-2300-224-10/2/7, Dec 65 (U), Operator M29, M29C, M76, M116, T46E1.
TM 9-2320-218-20, C2, Nov 65, M151 ¼-Ton Truck.
TM 9-2350-201-12, C7, Dec 65 (U), Operator, M41, M41A1, M41A2, M41A3.
TM 9-4935-515-15P/1, Nov 65, Hawk (USAR: None).
TM 9-4935-504-15P/2, Dec 65, Hawk.
TM 10-500-107, Nov 65, Airdrop of Supplies and Equip Rigging ½-Cubic Yard, Crane-Shovel Attachments.
TM 10-3950-204-25P, Dec 65, Crane, Truck, Warehouse Slewing Boom, Gas, Front Wheel Drive, Pettibone-Mulliken Mod 10F Army Mod MHE 195.
TM 11-372-5, Dec 65, Telephone Cable Splicing: Splice Finishing Joint.
TM 11-5805-204-15, Oct 65, SB-611/MRC, Communication Patching Panel.
TM 11-5805-356-12, Jan 66, AN/TCC-29 Telephone-Telegraph Terminal.
TM 55-1520-210-10 and -20, Dec 65, (UH-1).
TM 55-1520-211-10, Dec 65, (UH-1).

MODIFICATION WORK ORDERS

MWO 9-2320-224-20/7, Dec 65, Organizational, Carrier, Personnel, M114, M114A1. NORMAL
MWO 9-2350-215-20/18, C1, Dec 65, Operator, Tanks, Combat, 105MM Gun, M60A, M60A1. NORMAL
MWO 9-2350-215-20/25, C1, Dec 65, Operator, Tanks Combat, 105MM Gun, M60, M60A1. NORMAL
MWO 9-2350-215-20/27, C1, Dec 65, Operator, Tanks, Combat, 105MM Gun, M60, M60A1. NORMAL
MWO 9-2350-217-20/6, Jan 66, M108, M109. NORMAL
MWO 10-3900-200-20/1, Dec 65 Truck, Lift, Fork, Gas, 4,000-Lb, Minneapolis-Moline Mod MY40, Motec Mod MY40MB, 6,000-Lb Cap, Minneapolis-Moline Mod MY60RS, Motec Mod MY60MC, Installation of Spacer Blocks between Frame and Crossmember. NORMAL
MWO 55-1500-200-20/1, Dec 65, (UH-1). NORMAL
MWO 55-1520-209-20/29, Feb 66, (CH-47). NORMAL
MWO 55-1520-209-20/42, Jan 66, (CH-47). NORMAL
MWO 55-1520-210-20/15, Nov 65, (UH-1). NORMAL
MWO 55-1520-210-20/16, Jan 66, (UH-1). NORMAL
MWO 55-1680-200-20/1, C1, Jan 66, Fixed & Rotor Wing. NORMAL

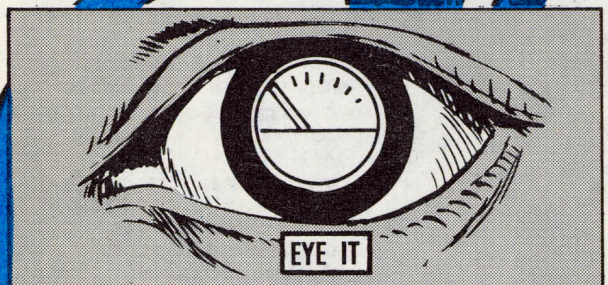
You say that you're about to pull a Preventive Maintenance Daily on your bird? Good deal. Just stay loose and play it cool, man.

To really check out the object of your attention it's a capital idea to develop a "roving eye" and make the "feel" test.

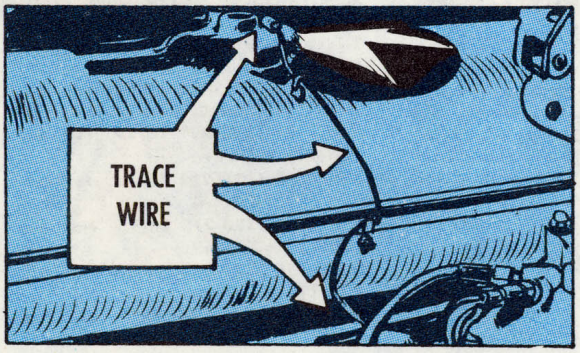
Say, for example, you're running thru a TM 55-1520-204-20PMD (17 Jun 65) on your Sioux (OH-13). Seq. No. 1.9 says to eye the cabin interior for obvious damage and there, smack in front of you (with the battery switch on) is a zero-reading fuel gage . . . and the ship was just re-fueled!

CHECKING OUT A BIRD PART?

EYE IT — TRY IT



But hold one! Before you decide the gage is kaput here's a good place to use the "roving eye" technique, sure 'nuff. All you do is trace the electric wire from the gage to the fuel tank.



Ordinarily this shot wire would be picked up on the PMI, Seq. No. 2.22, but when you're dealing with vibration, friction and engine heat to boot you never can tell when the wire covering will let go.

So, it's not unusual for the wire covering to wear thru to the bare wire, shorting out the fuel gage. Finding the real problem will save you a lot of fix-it time and elbow grease.

AIR MOBILITY

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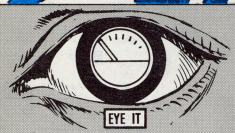

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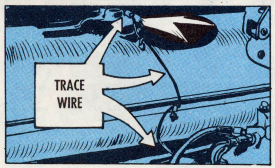

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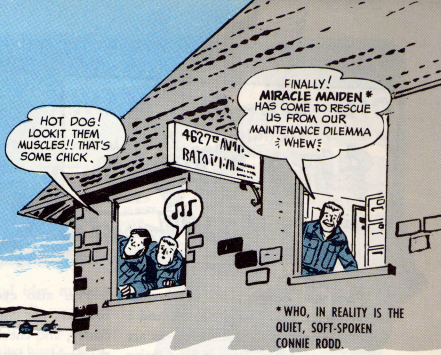
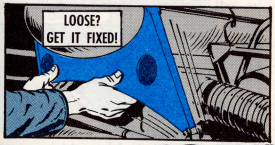


Take another example—checking the fuel tank and support for damage and security as called for in Seq. No. 2.2 of the Sioux PMD. Now here's where you can put some real feeling into your work.



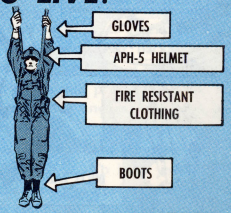
Plant your mitts on the tank support and use a little back-and-forth muscle power. Any movement or popping sound will tell you that you've got a faulty tank support that needs to be fixed before the bird is released for the flight.

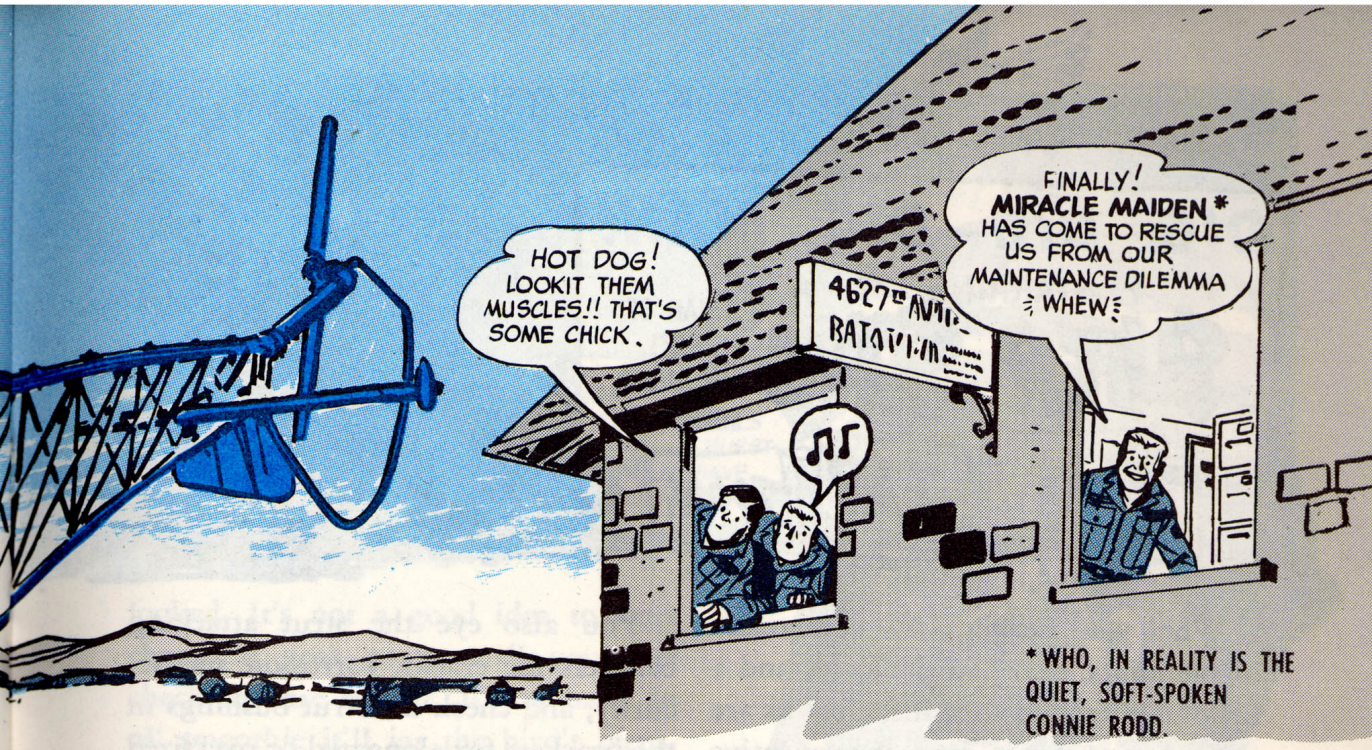
So-o-o . . . play it cool when you pull the PMD. If lock wire is broken, a cotter pin is missing, or a nut is loose, you'll spot the problem by adopting the "roving eye" and "feel" technique. Give it a try.

DRESSED TO LIVE?

When you sally forth to meet that someone special, you're dressed to kill, right? But how 'bout the next time you're scheduled to take off on a mission. Are you dressed to live?

If you have any doubt, schedule a showing of Training Film 46-3605. It'll show you the benefits of wearing the APH-5 helmet, fire resistant clothing, gloves and boots . . . in color, no-less!





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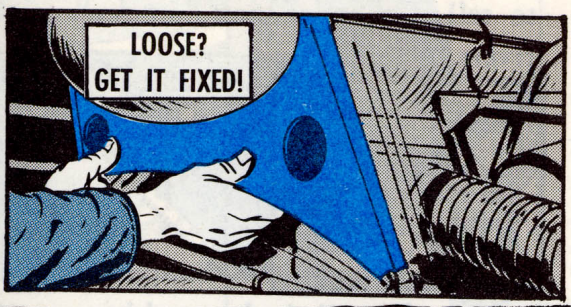

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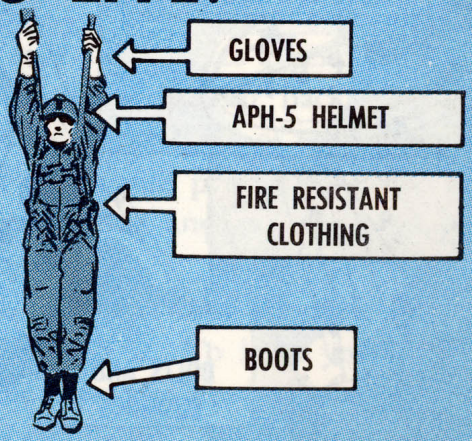


TO SPRUCE UP AN AGING BEAVER...

DIG—DIG—DIG, MAN!

★ ★ STARRING ★ ★

SUPER SONIC

MAN OF STEEL, ALUMINUM, COPPER, ETC.

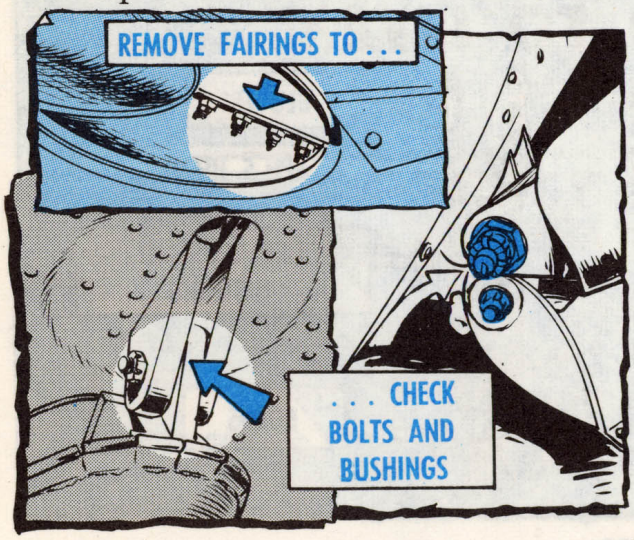
POW! ZAP ZOOM

When your Beaver (U-6) gets creaky in the joints, shaky in the knees and a little pale around the gills, chances are she's due an extra dose of preventive maintenance on the Periodic.

Sure, Ol' Reliable gets regular PM every 100 hours. But it's during those 2nd, 3rd, 6th (you name it) PMP's that you want to dig deeper . . . pulling medicare on an aging bird you might call it.

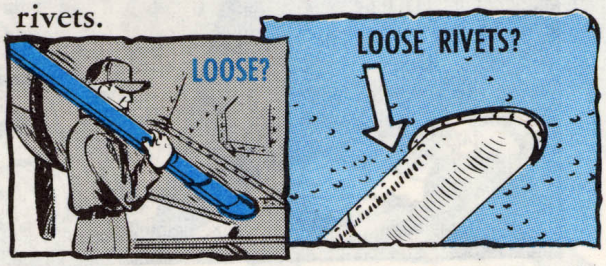
HOW'S YOUR STRUT ?

Take the wing strut listed in TM 55-1510-203-20PMP (30 Jul 65). Normally you just eye the strut for damage. But on the 3rd PMP you take out the attaching bolts and give them a magnetic particle check.



You also eye the strut attaching brackets for cracks, corrosion and security, and check the strut bushings in the brackets for elongated or oversized holes. You're allowed 0.003-in wear between the bushings and bolts.

While you're at it, tho, this is a good place to strut your stuff. Make with a little muscle on the strut before you actually take it off. Then you'll be able to tell if there're any "creaky" loose rivets.



This dig-a-little-deeper bit pays off in fewer future write-ups and less down time for your bird. Remember that the PM checklists are the minimum inspection requirements. So go to it!

EYE TAIL WHEEL TIRE

Another write-up that you might head off is a shaking, shimmering tail wheel. The fuselage area, where the gear is attached, gets a good going over every 2nd PMP and the wheel gets a lot of attention on the PMD.

But sometimes the obvious gets over-

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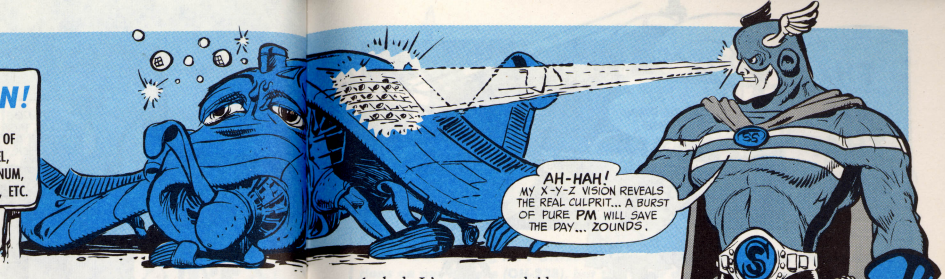

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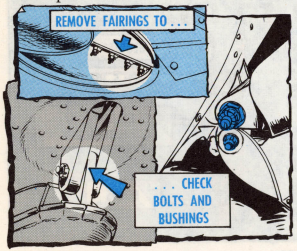

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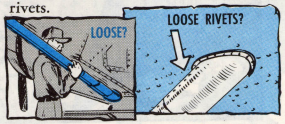

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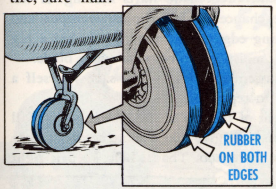
But sometimes the obvious gets overlooked. It's not a good idea to start changing gear parts until you first check the tire rubber. If you have an ol' smoothie it'll jar the bird's bicuspids. This also has a decided effect on the pilot!!

For a smooth-rolling bird you need rubber on both edges of the tail wheel tire, sure 'nuff.



KEEP RADIO CONTROLS DRY

When you eye the avionics compartments for damage and security on the PMP, be sure not to overlook the SB-327/ARC-44 and C-1827/ARC-55 control panel cover on the top of your Beaver. If those panels get wet the contacts will corrode and that plays hob with the sets.

To cut down on radio squawks, be sure you take the cover off and dry the compartment thoroughly.

Yessir-e-e, it takes a heap of PM to put an aging Beaver back in shape. Even brushing a coat of varnish on the door frame will protect the wood and save the time and expense of a part change.

So, the next time you face up to a PMP—dig in. To keep your Beaver in the blue you need all the savvy at your command.

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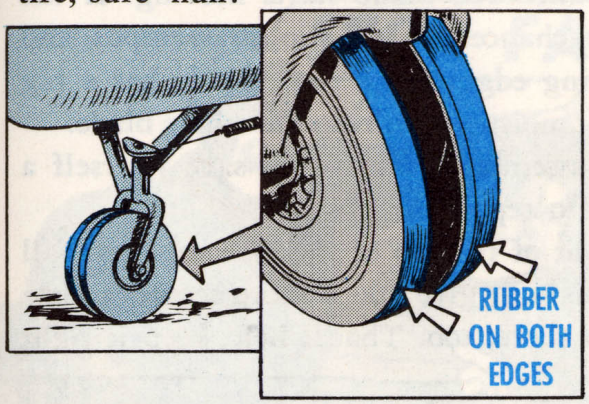

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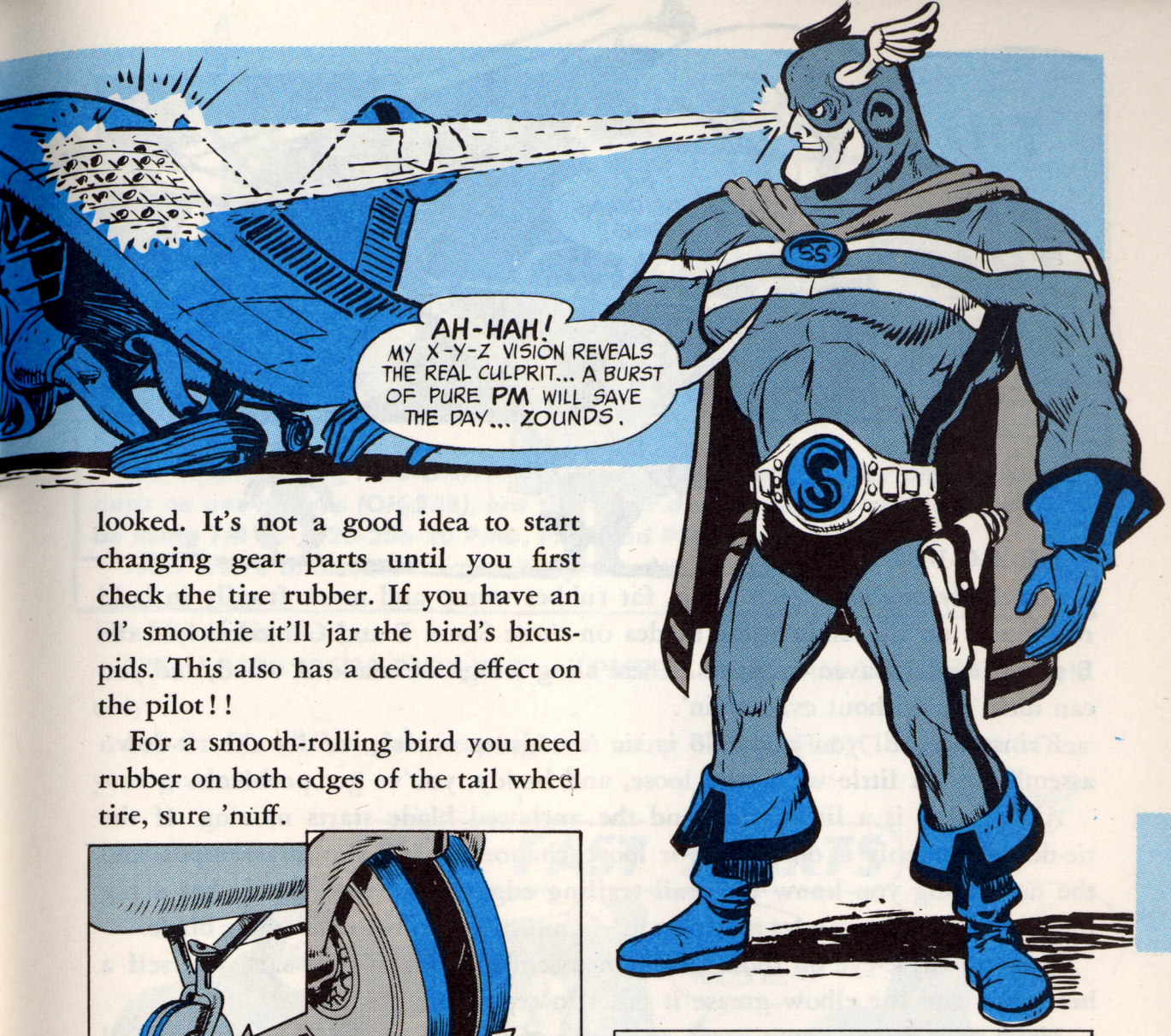

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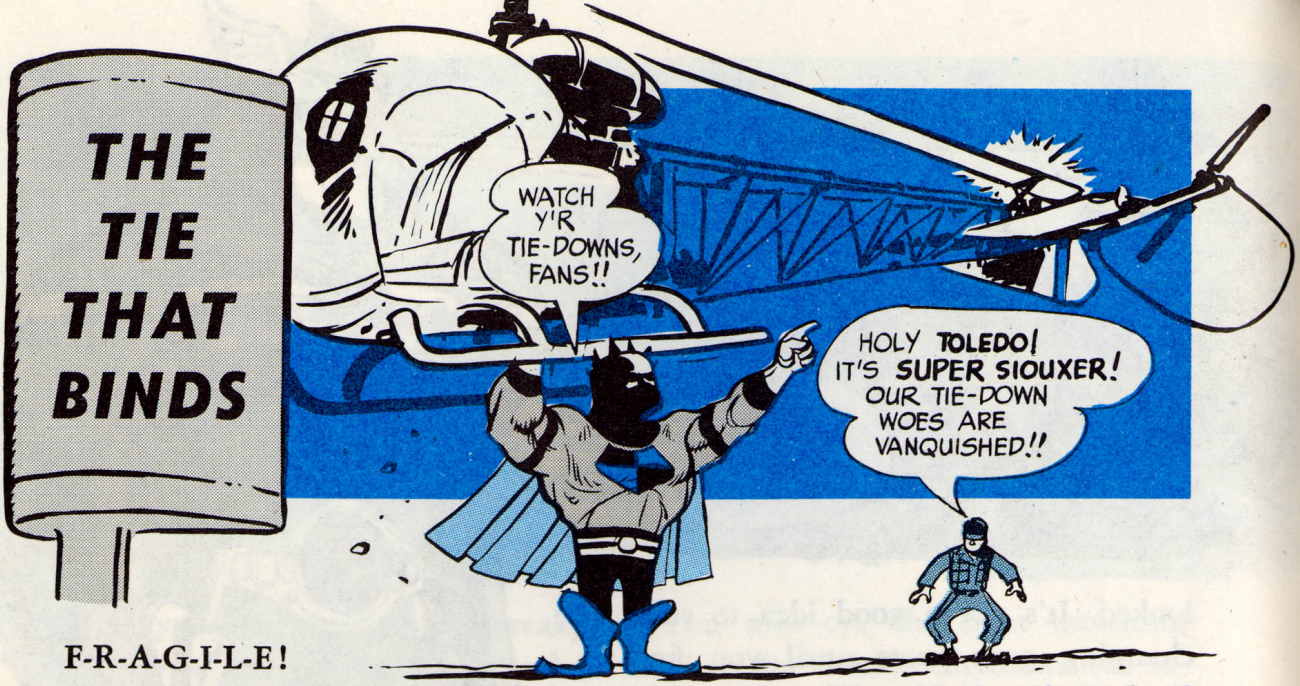


F-R-A-G-I-L-E!

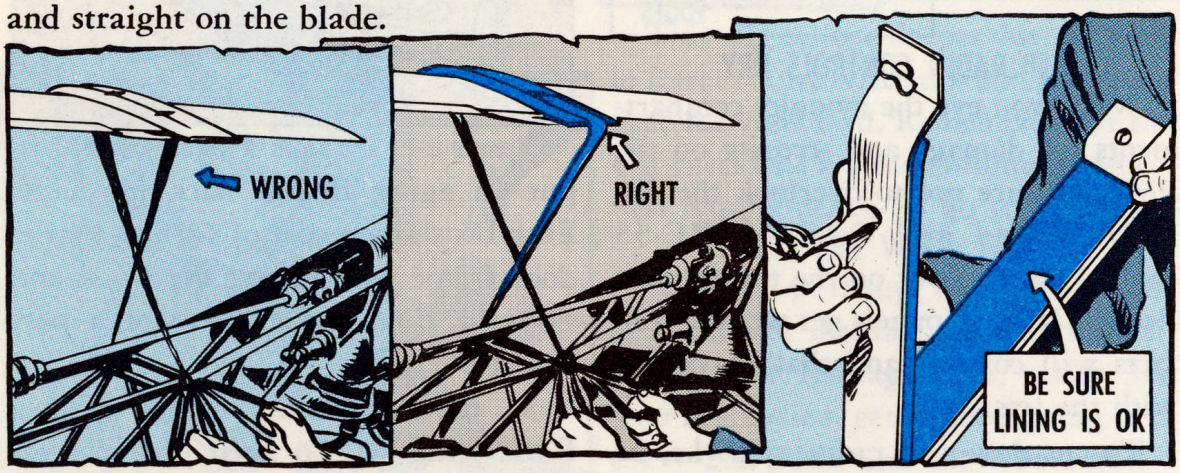
Somebody ought to grab a big, fat rubber stamp and mark **fragile** in bold red letters on the main rotor blades on those Sioux E and G models and the B and C model Raven choppers. These sling wings are made of wood, and you can nick 'em without even tryin'.

F'rinstance, all you gotta do is tie 'em down wrong, or let the tie-down assembly get a little worn and loose, and buddy, you've got problems.

All it takes is a little wind and the anchored blade starts moving. If the tie-down assembly is on wrong or loose, chances are it'll slip catawampus, and the next thing you know the frail trailing edge of the rotor blade has a big nick in it. The nick can let moisture in . . . moisture can ruin the whole blade.

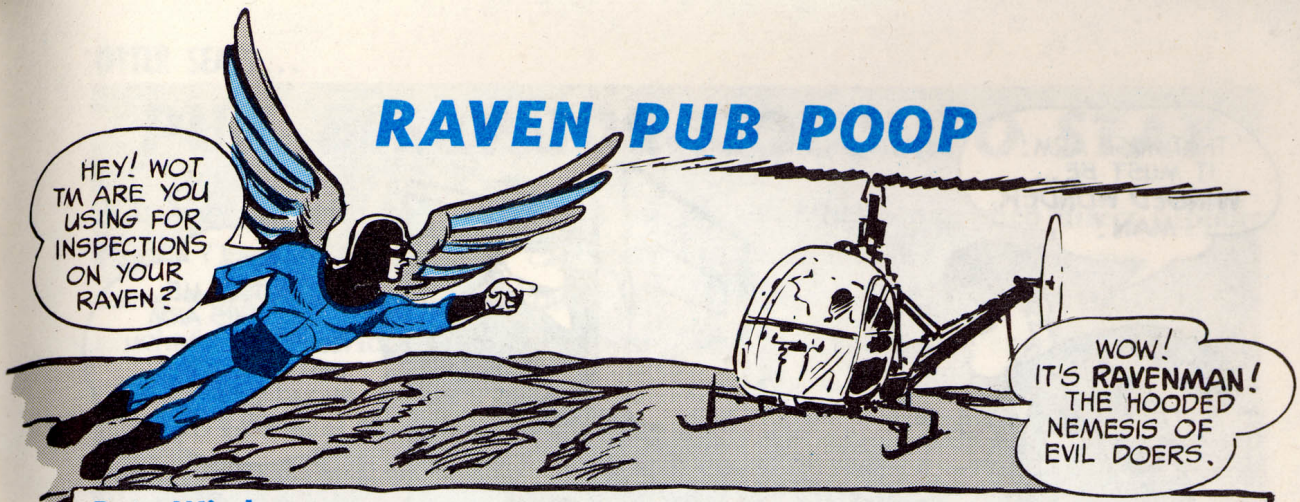
Keep an eagle-eye on those tie-down assemblies, and you'll save yourself a headache, and the elbow grease it takes to repair the blades.

Make sure the tie-down cords come out of the top of the assembly and fall down across the edges of the blade. This will give you a more secure anchor job. Be sure there's a healthy lining in there, too. That'll help keep it tight and straight on the blade.



If your bird's got metal blades, they bear tender lovin' care, also, and the same tie-down dope applies to 'em all.

RAVEN PUB POOP



Dear Windy,

We've been using TM 1-OH-23C-6 (26 Oct 64) as the guide for pulling inspections on our Ravens (OH-23B), but the other day somebody said we ought to be using TM 55-1520-206-20 PMD, PMI, and PMP checksheets.

Now we're in doubt. Can you help us out?

SP5 R. A.

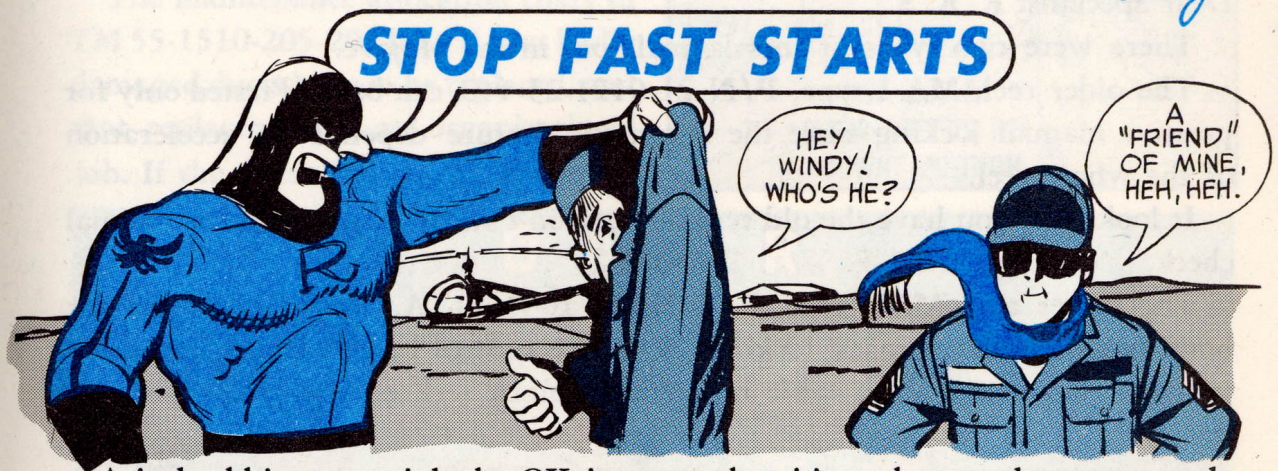
Dear Specialist R. A.,

TM 55-1520-206-20 PMD, PMI and PMP are used for the D, F and G models only.

For the B and C models keep right on using TM 1-OH-23C-6 (26 Oct 64) as your guide.

Windy

STOP FAST STARTS



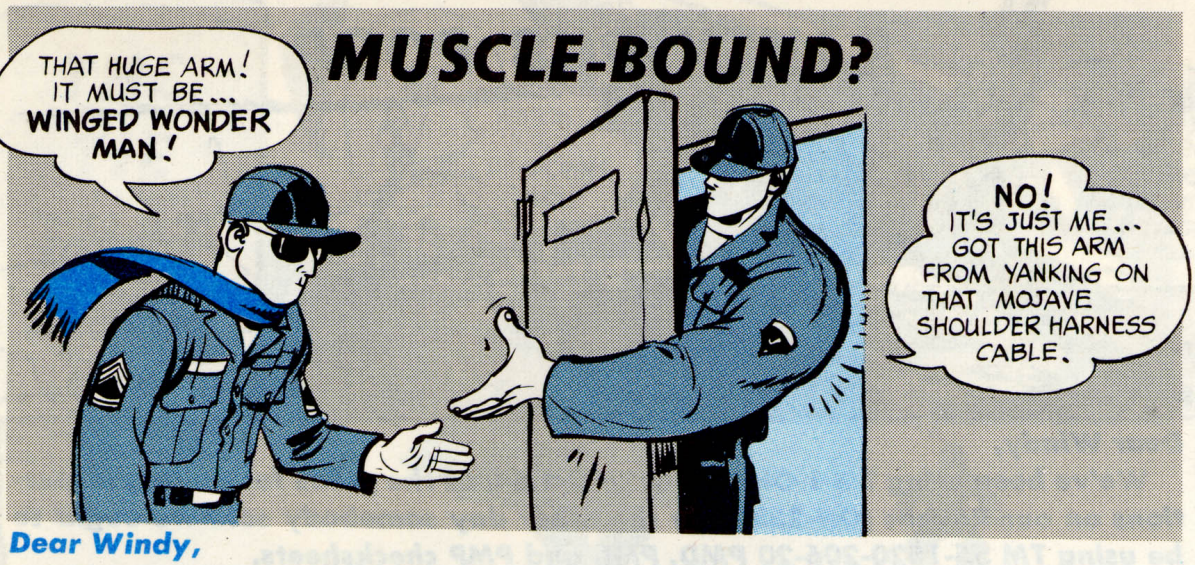
A jackrabbit start might be OK in a race but it's verboten when you crank up a recip-powered chopper like the Raven (OH-23).

TM 55-1520-206-10CL (10 Feb 65) says to open the throttle until you feel the detent and then back off slightly. This will give you the RPM just above idle, which is just what you want.

If the throttle is open up beyond the detent you'll get a fast start and on an un-loaded engine this is murder on accessory drive shafts.

It only takes a few fast starts to weaken the generator drive shaft—for one. With continued fast starts the shaft will shear off and that means a deadlined bird, for real.

So, stick with the Pilot's Checklist . . . no matter what bird you crank up.



Dear Windy,

Before I develop a muscle-bound arm, can you give me some dope on how to check the Mojave (CH-37) shoulder harness lock?

Area 8.10 of TM 55-1520-203-20PMP (18 Jun 65) says to check for positive locking. The manual position is no problem but no matter how hard I yank on the reel cable in the automatic position, it won't lock.

What gives?

SP5 R. R. S.

Dear Specialist R. R. S.,

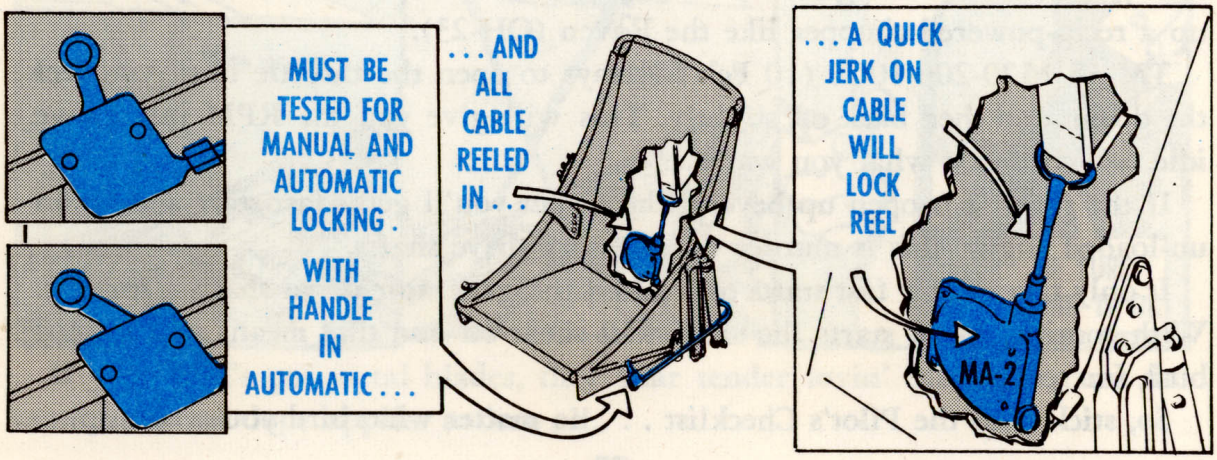
There were two types of inertia reels put in the Mojave.

The older reel, MA-1 type, P/N 21-0121-23-440, can be field tested only for positive manual locking since the automatic feature depends on acceleration of the whole reel.

It looks like you have the old type — but don't sweat it. Just pull the manual check.

The newer reel, MA-2 type, P/N HR30-1001-40-1A, should be tested for both manual and automatic locking. With the control handle in the automatic position and all the slack cable reeled in, a quick jerk on the cable will lock this reel.

Windy



OTTER SEATS...

PUT 'EM UP OR DOWN TO STAY

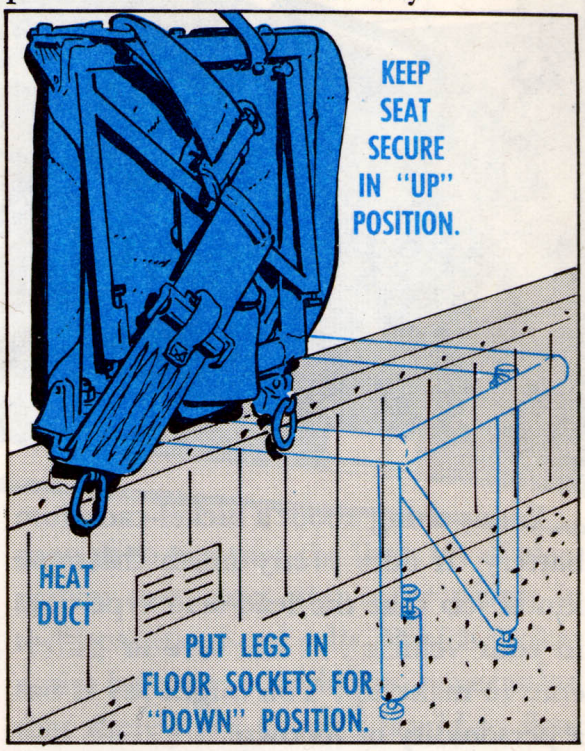
It may be hard to believe, but an empty Otter passenger seat can spell extra work and trouble for you if it's not lashed up, or locked down in position properly.

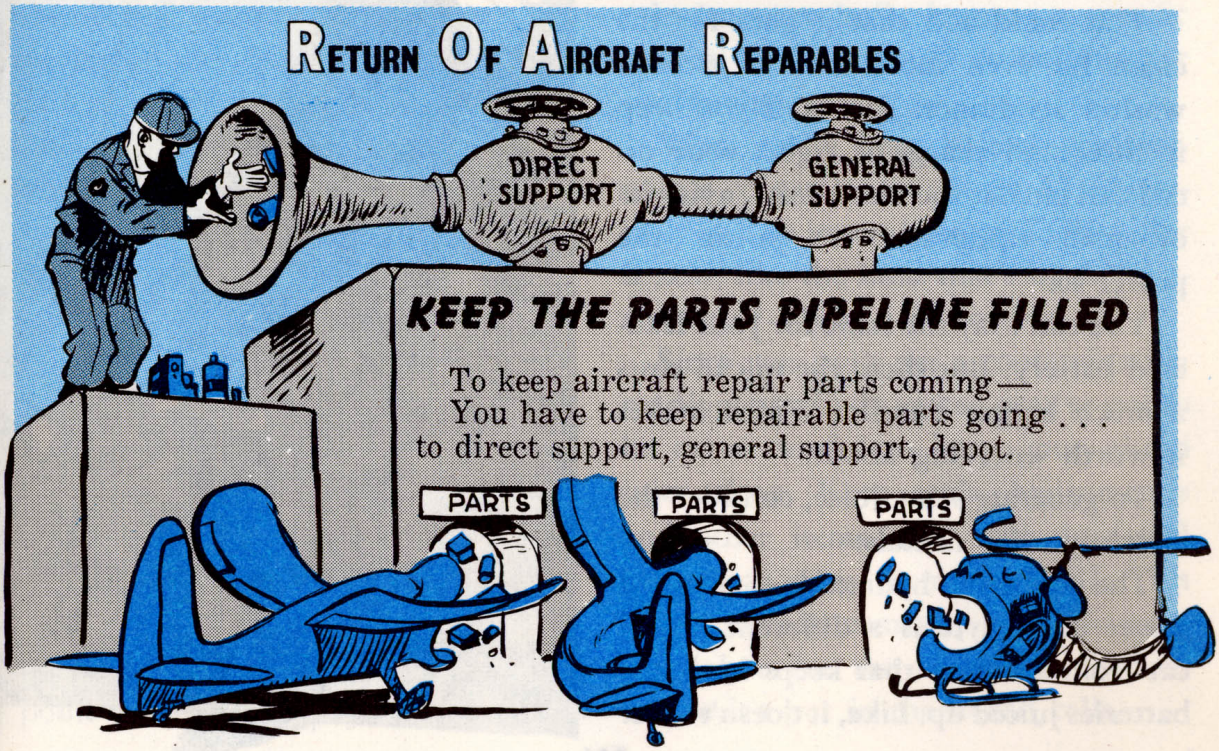
That U-1 seat is not very big, or heavy, but if it slips loose from the wall and falls, chances are it'll put a couple healthy dents in the aluminum heater duct it's mounted on.

Without the legs of the seat in place, the seat will fall past its normal position, forcing the hinges into the duct. The same thing can happen if the legs are not locked in position and fold up under the seat with a passenger in the seat.

The maintenance allocation chart in TM 55-1510-205-20 (Jul 65) says badly damaged ducts have to be replaced, and that replacement is an organizational job. If the duct's not damaged enough to need replacing, then direct support can iron out the dents for you.

The easiest thing to do, tho, is to put 'em up or down to stay . . . that's the preventive maintenance way.





Funny thing about a nickel-cadmium battery. It does pretty much the same kinda job that the lead-acid type does in your vehicle . . . but vive la' difference in make-up! You might say it has a personality of its own.

You could add that it goes for the clean bit even more than a raccoon washin' its dinner. Fact is, if you keep it clean and charge it right, your ni-cad can outlast the electronics, avionics or other equipment it's puttin' the power to.

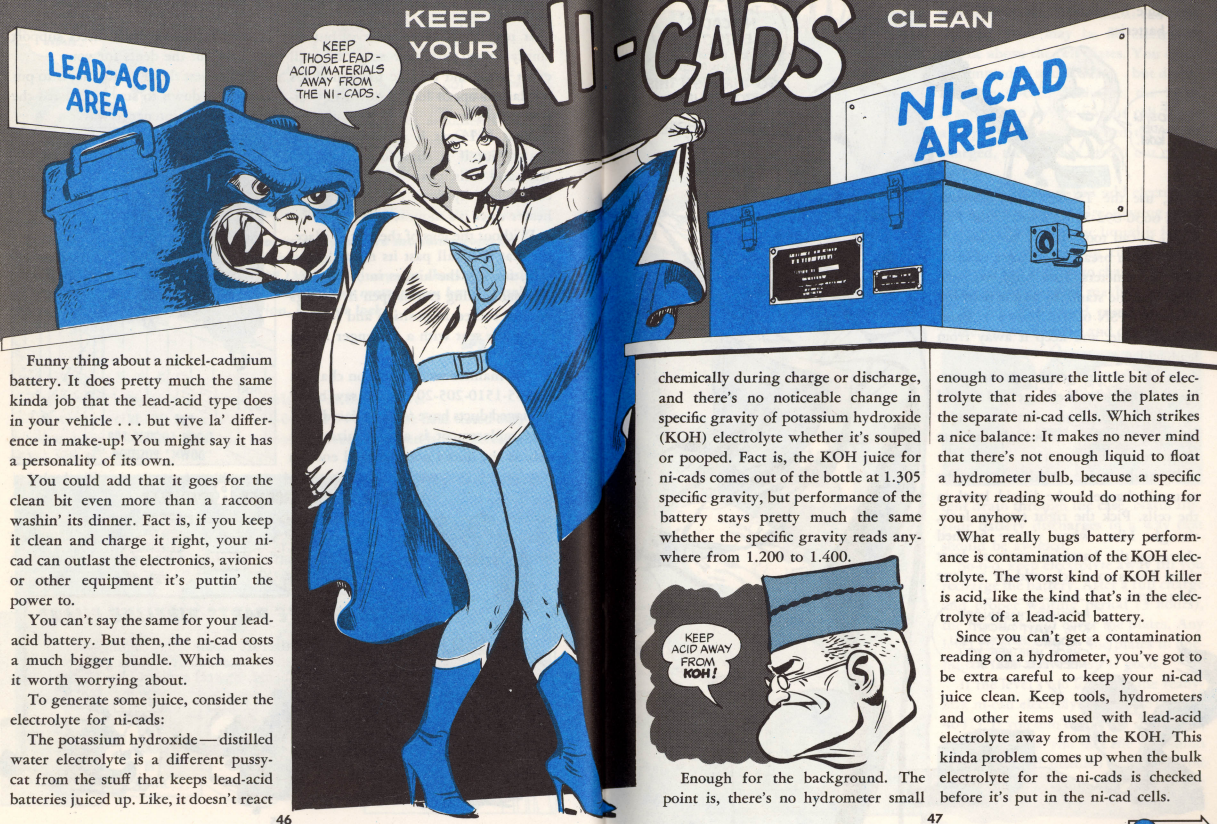
You can't say the same for your lead-acid battery. But then, the ni-cad costs a much bigger bundle. Which makes it worth worrying about.

To generate some juice, consider the electrolyte for ni-cads:

The potassium hydroxide—distilled water electrolyte is a different pussy-cat from the stuff that keeps lead-acid batteries juiced up. Like, it doesn't react

IF YOU WANNA GET A CHARGE OUT OF 'EM—

KEEP YOUR NI-CADS CLEAN



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To generate some juice, consider the electrolyte for ni-cads:

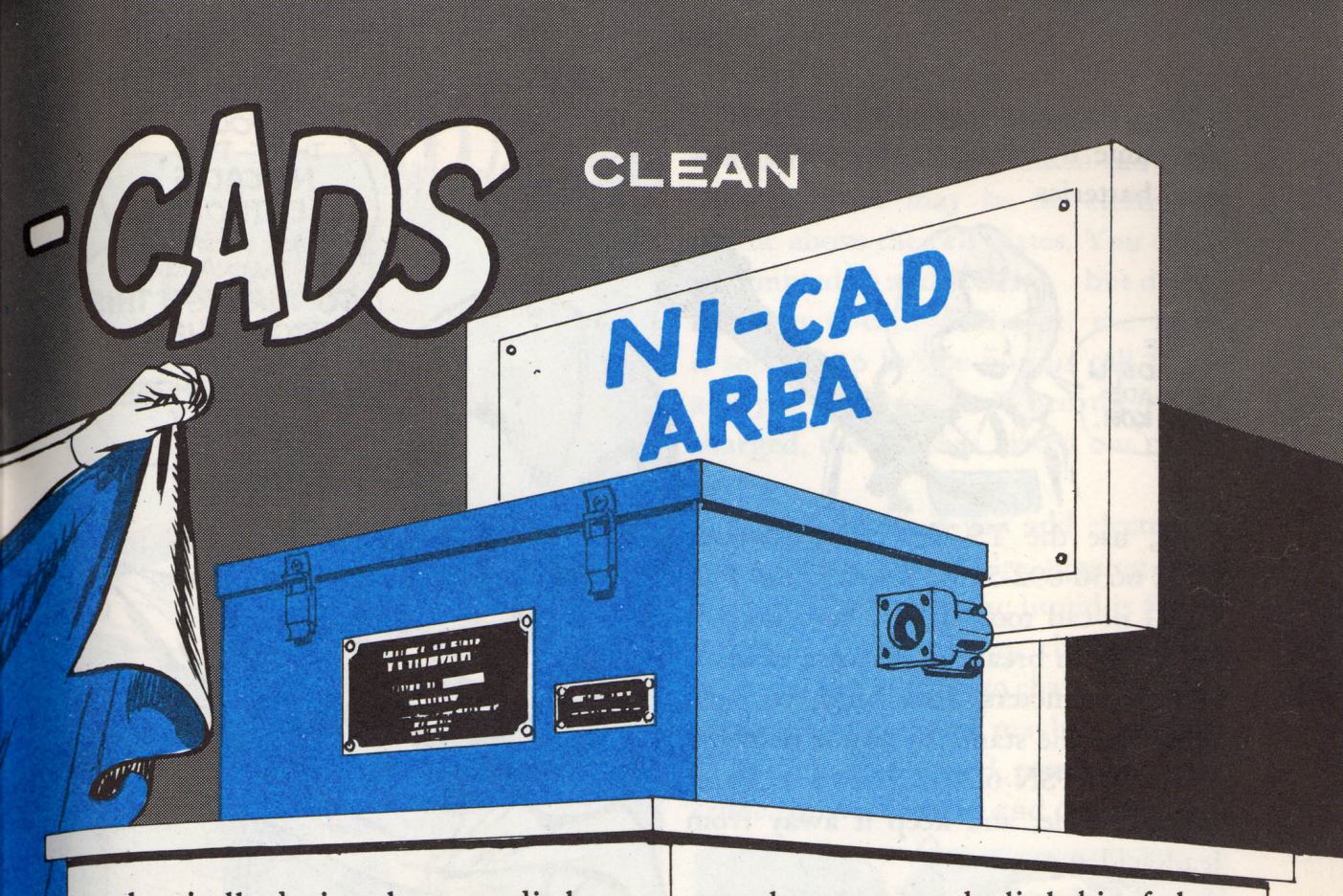
The potassium hydroxide—distilled water electrolyte is a different pussycat from the stuff that keeps lead-acid batteries juiced up. Like, it doesn't react chemically during charge or discharge, and there's no noticeable change in specific gravity of potassium hydroxide (KOH) electrolyte whether it's souped or pooped. Fact is, the KOH juice for ni-cads comes out of the bottle at 1.305 specific gravity, but performance of the battery stays pretty much the same whether the specific gravity reads anywhere from 1.200 to 1.400.

Enough for the background. The point is, there's no hydrometer small enough to measure the little bit of electrolyte that rides above the plates in the separate ni-cad cells. Which strikes a nice balance: It makes no never mind that there's not enough liquid to float a hydrometer bulb, because a specific gravity reading would do nothing for you anyhow.

What really bugs battery performance is contamination of the KOH electrolyte. The worst kind of KOH killer is acid, like the kind that's in the electrolyte of a lead-acid battery.

Since you can't get a contamination reading on a hydrometer, you've got to be extra careful to keep your ni-cad juice clean. Keep tools, hydrometers and other items used with lead-acid electrolyte away from the KOH. This kinda problem comes up when the bulk electrolyte for the ni-cads is checked before it's put in the ni-cad cells.

MORE



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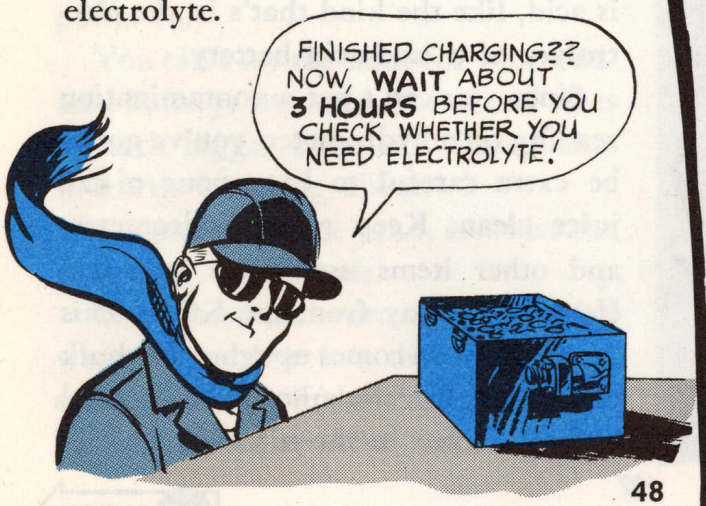
PS MORE

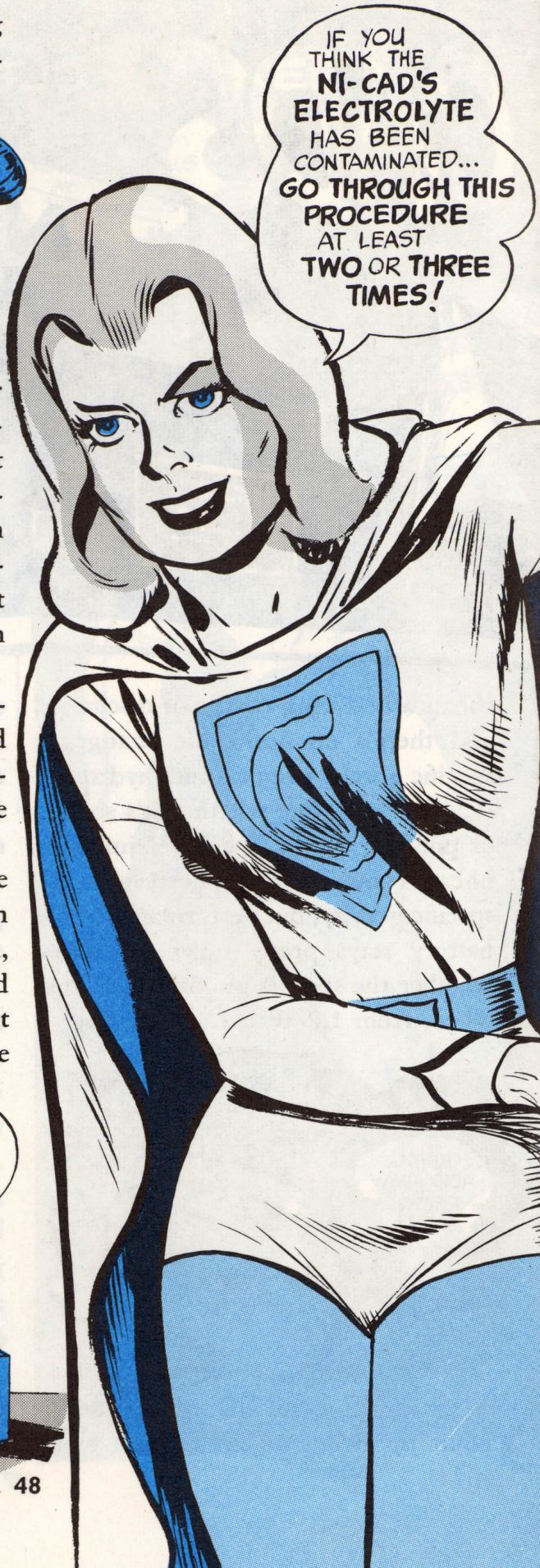
You can poison your ni-cad by using the same hydrometer for it and lead-acid batteries.

So, use the TS-203/U hydrometer (FSN 6630-892-5151) that's in the TK-90/G ni-cad tool kit . . . and keep it from within breathin' distance of lead-acid hydrometers. In a bind, you can substitute the standard motor pool hydrometer (FSN 6630-171-5157). Paint its bulb blue, and keep it away from lead-acid types.

In normal storage, the specific gravity of KOH doesn't change and should not require checking. Besides, a specific gravity check wouldn't indicate the state of charge.

What does give you the clue on the state of charge is the liquid level in the cells. Pick the right time to look, though. Like, when you've finished charging the batteries, wait at least three hours to check, add or remove electrolyte.





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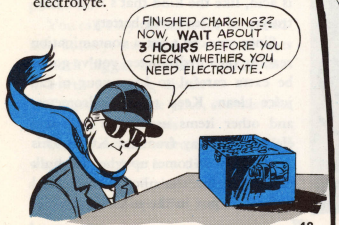
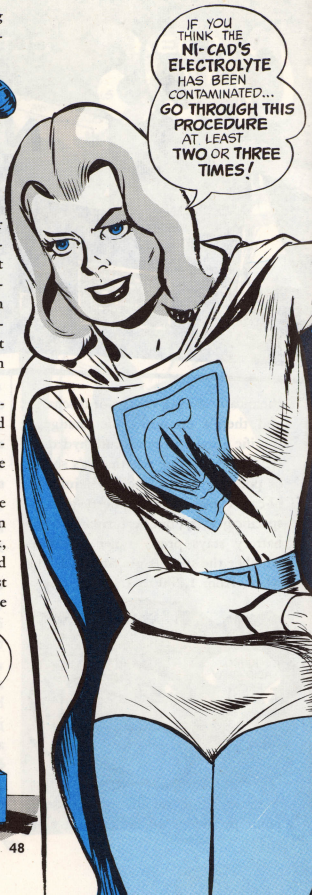
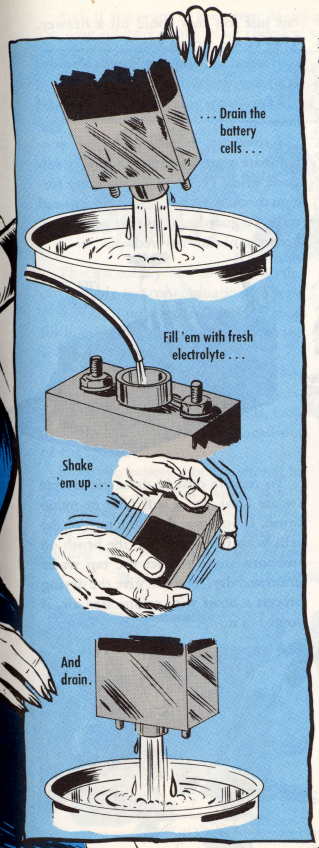




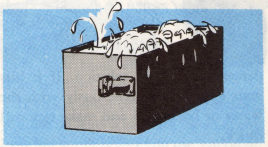


Otherwise, the liquid level can fool you. F'rinstance, when the ni-cad's discharged there may be no electrolyte visible above the cell plates. You could be tempted to add KOH . . . but desist!

When ni-cads discharge, the KOH is sopped up by the porous cell plates and you can't see it. When the cell is charged, the KOH is forced out of the plates.

Which means if you add electrolyte before charging, you're playing with danger. Like, when the liquid is forced from the plates during charging, the stuff you put in prior to charging causes excess gassing — and, maybe explosion.

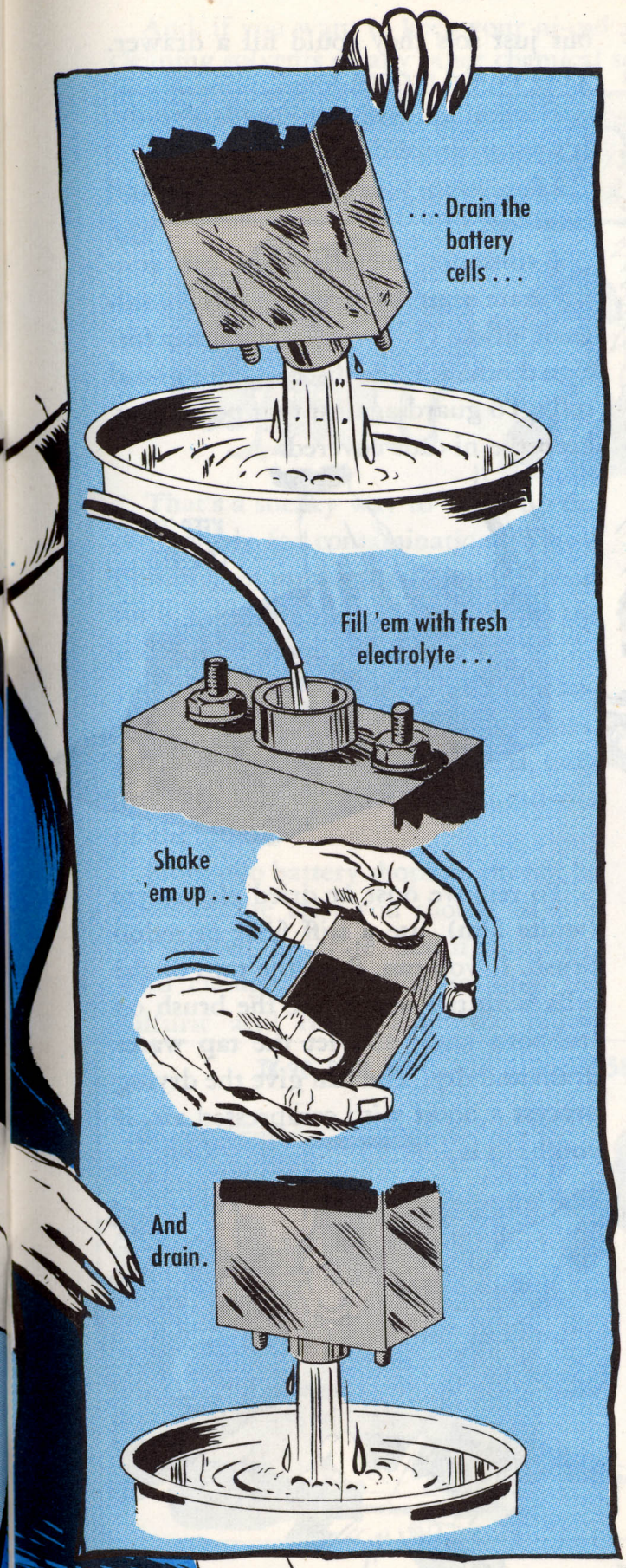
Your excess liquid compounds the crime by overflowing and creating current drain through the case. Naturally, your battery discharges in a way that should be avoided.



So-o-o, keep electrolyte away till you recharge the battery. After a full charge and proper waiting period (3 hours), the liquid should cover the plates. Any level from the top of the plates to one-fourth inch above them is good.

If the level's too low, add the ready-mix ni-cad electrolyte (FSN 6810-543-4041). If you don't have the ready-mix, be careful how you mix the potassium hydroxide and distilled water. If you mix it wrong, you could make big problems.

MORE



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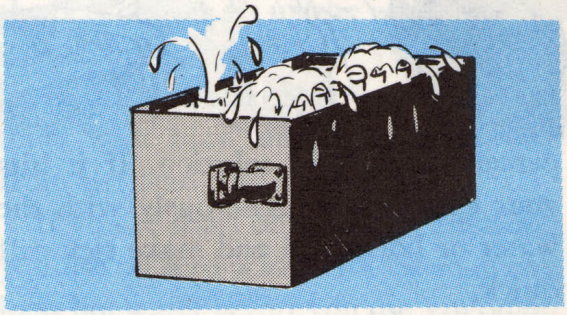

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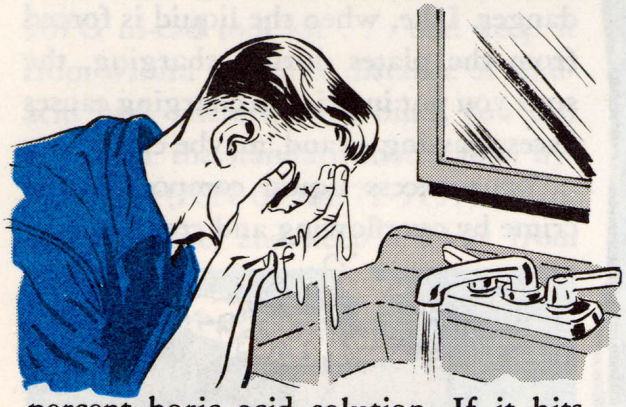
PS MORE

KOH (potassium hydroxide) generates heat; it's corrosive, and dangerous to you, if you mis-use it.

The BIG point: Never pour your distilled or de-mineralized water directly onto the KOH. The fast heat build up can splash it in your face — which means run, don't walk, to the nearest splashable cold water!

If the KOH splashes on your clothes, hands or whatever, flood the splashed area with the cold water — or three



percent boric acid solution. If it hits your eyes, splash generously with the water or boric acid and make sick call quick.

The way to avoid those problems is to add the KOH to the water. Pour the KOH in a little at a time so that it has time to dissolve. Which means pour the KOH v-e-r-y s-l-o-w-l-y.

For best protection, follow the rules and wear the gear provided — like rubber gloves, rubber apron and protective goggles. Those items weren't passed out just so's they could fill a drawer. They're for serious use.

PROTECTION

But enough with the liquids already. It's time for solid advice.

Like, keep your ni-cads clean, and keep 'em dry.

F'rinstance, metallic dust can contaminate your battery as badly as sulfuric acid. The dust, or any other foreign conductor, can discharge the ni-cad cells. To guard against that possibility, keep the ni-cads covered.

To remove dust or dried electrolyte (white film), use a stiff fiber or nylon brush. If you can, flush the tops of the cells with tap water; use the brush on stubborn stuff, and let the tap water drain and dry. You can give the drying process a boost with compressed air, if you have it.

And, if you want to keep your ni-cad alive and productive, keep it away from cleaning solvents or any other chemical solution.

PUT THIS DOWN IN BIG RED LETTERS SOMEWHERE: NEVER, **N-E-V-E-R** LET A LEAD-ACID BATTERY OR ANYTHING USED ON LEAD-ACID BATTERIES COME ANYWHERE NEAR A NI-CAD. IT'S A REAL QUICK WAY TO PUT YOUR NI-CAD OUT OF BUSINESS.

That's a sneaky way to bring up the old remedy for contamination: Where possible, set up a separate battery shop for ni-cads. Keep it as far away from the lead-acid area as possible.

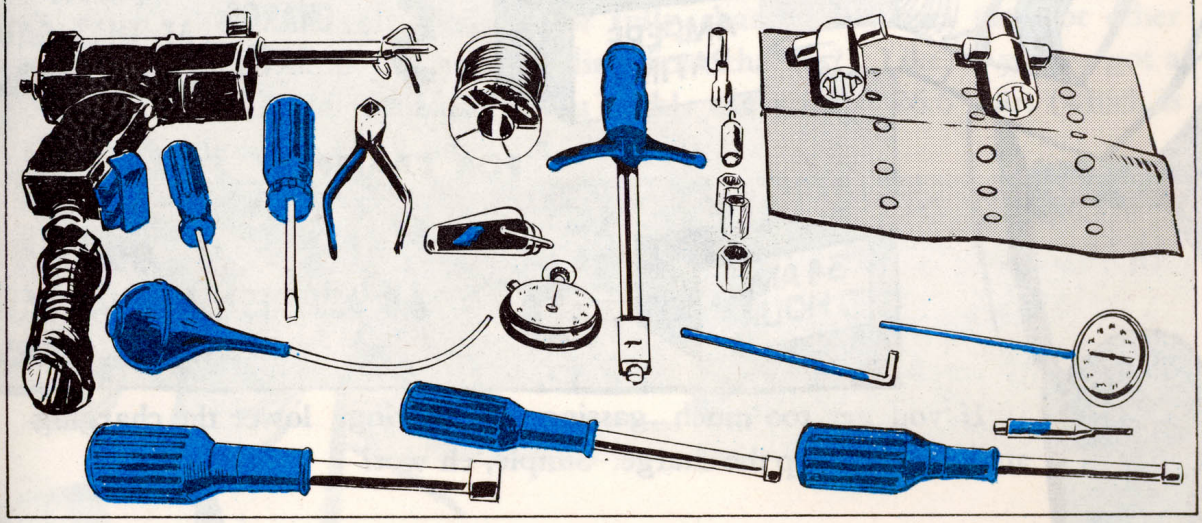
Those ol' words ain't just for whistlin'. Any traces of lead-acid gook transferred to ni-cads from your hands, tools or whatever can belt your ni-cad out of the game.

Since two battery shops might not be possible, the least you should have is partitioned separate bench facilities, with enough ventilation to keep the sulfuric acid fumes from the ni-cad area. If that's what you gotta do, then it'll pay to keep the ni-cad bench as far as possible from the lead-acid. And, to save a battery or two, you might tell your finger-twitchin' shop visitors why the benches are set up the way they are.

Another must: Keep your battery tools color coded. Splash your ni-cad tools with blue, and keep 'em away from the lead-acid variety.

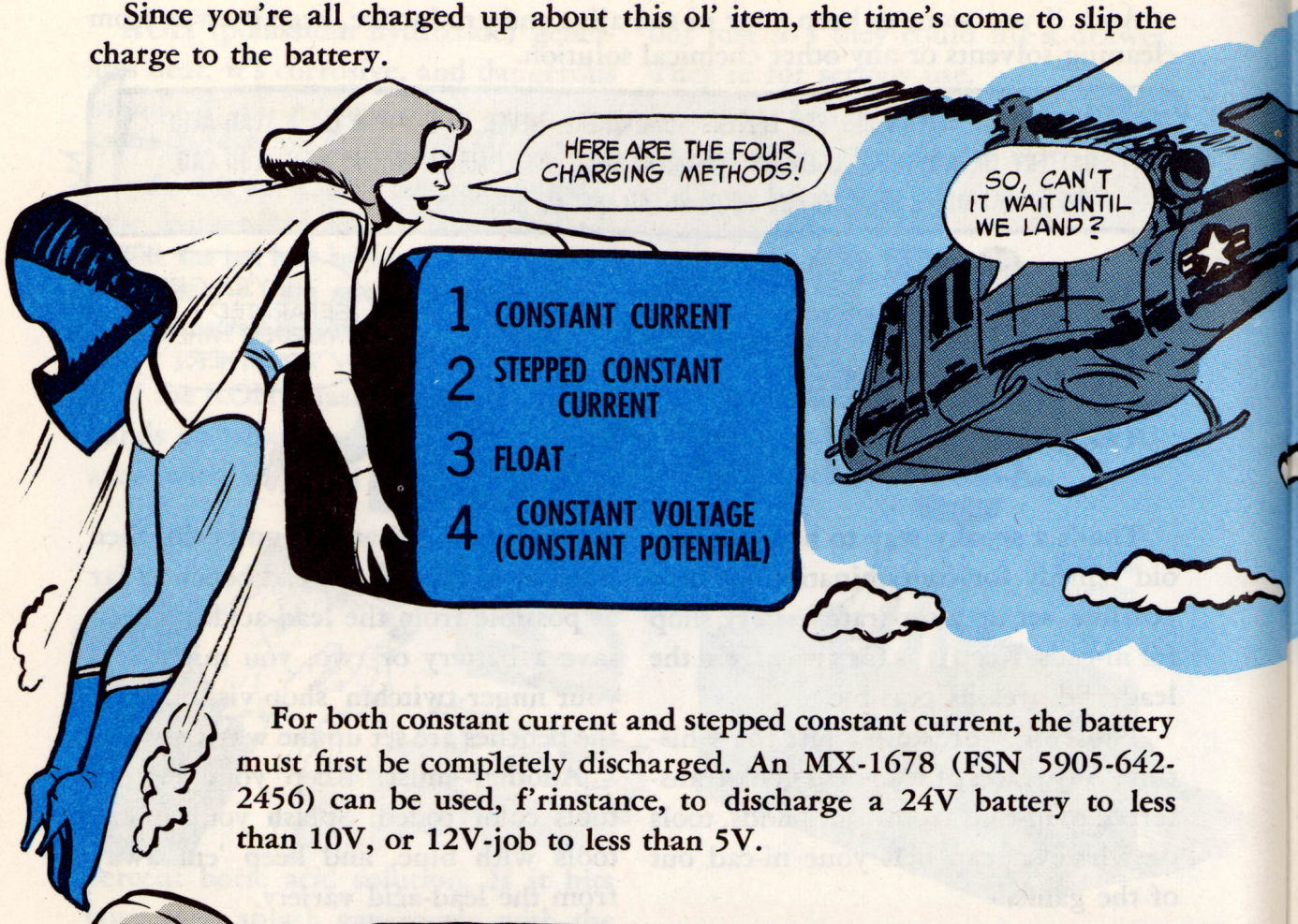
If you're short on tools, hit anything you use on lead-acids with GI soap and lotsa hot water before you use 'em on ni-cads. And do the same with any ni-cad tools you're about to use on lead-acids.

TK-90 TOOL KIT FSN 5180-542-5812 SM 11-4-5180-R03 (MAR 64)

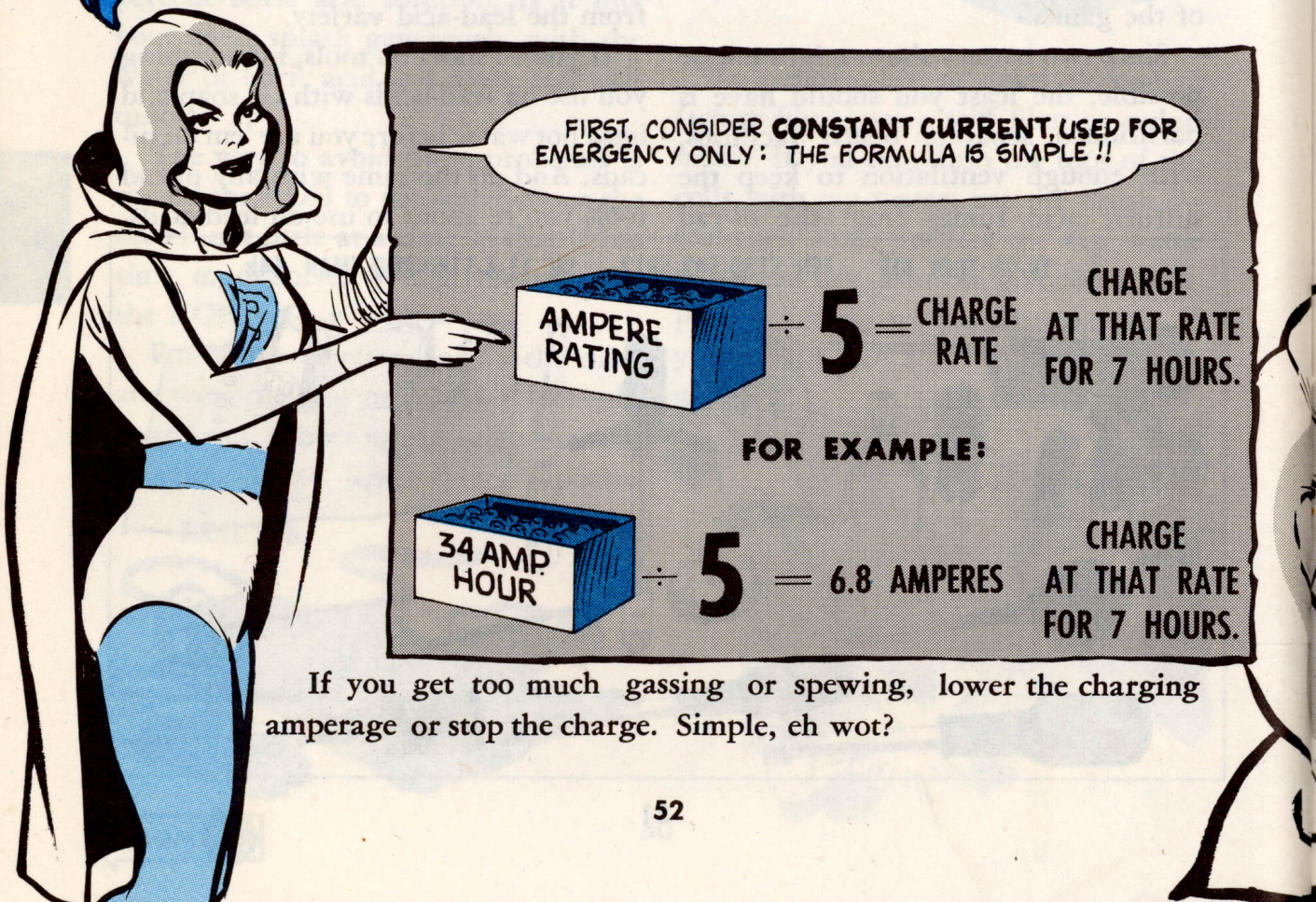


P.S. MORE

Since you're all charged up about this ol' item, the time's come to slip the charge to the battery.



For both constant current and stepped constant current, the battery must first be completely discharged. An MX-1678 (FSN 5905-642-2456) can be used, f'rinstance, to discharge a 24V battery to less than 10V, or 12V-job to less than 5V.



If you get too much gassing or spewing, lower the charging amperage or stop the charge. Simple, eh wot?

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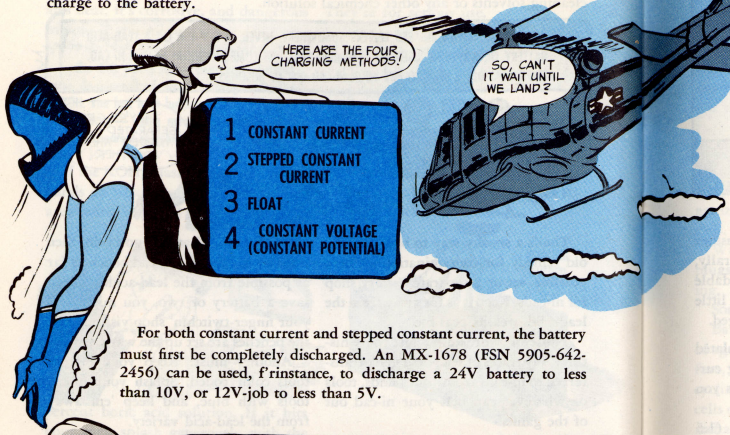

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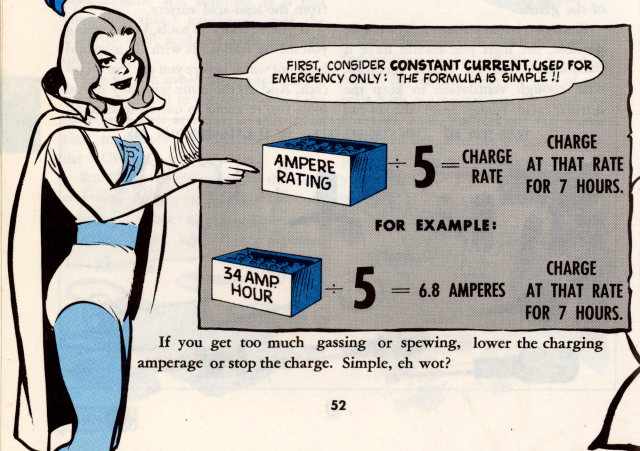
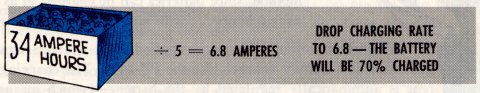


If you get too much gassing or spewing, lower the charging amperage or stop the charge. Simple, eh wot?

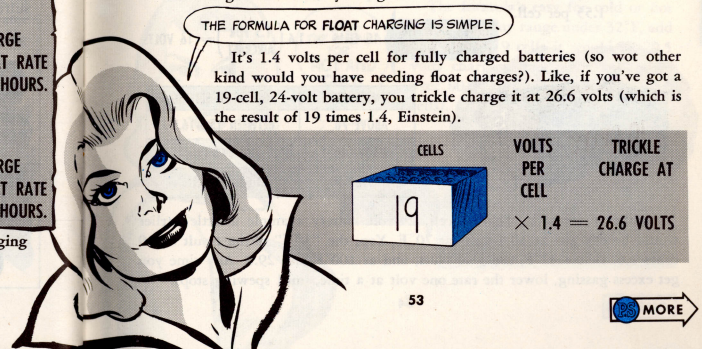
The stepped constant current method is for rapid charging and goes like so:

After discharging, start the charge of a 34-ampere-hour battery at 34 amperes charging rate. When it begins to gas (about 45 minutes), work out the same formula you did for constant current. Like, 34-ampere-hours divided by five gives you 6.8. Drop the charging rate to 6.8 amperes. At the gassing point, when you drop the charging rate, the battery will be about 70 percent charged. Stop the charge when the voltage of the battery reaches 31 or 32 volts for a 19-cell battery, f'rinstance. Stop at 31 volts above 32°F, and go to 32 volts below 32°F.



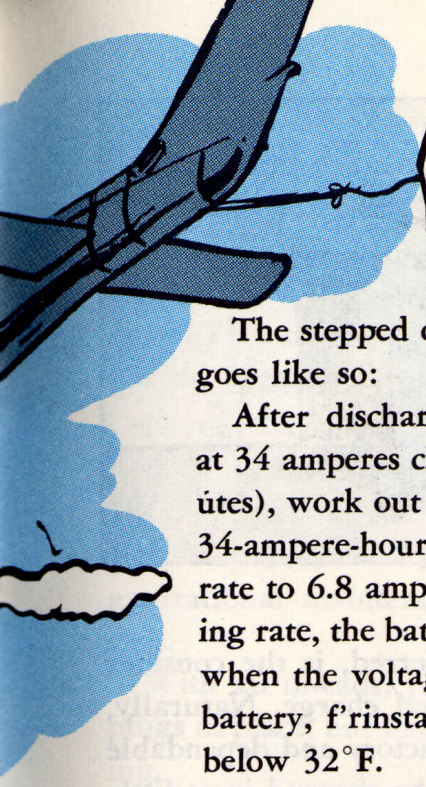
Naturally, if you have a 20-ampere-hour battery, you'd start the stepped constant current charge at 20 amperes; drop it to four amperes at gassing, and so on . . . adjusting the charge to your ampere-hour rating.

With either constant current method you can use a rectifier or a motor-generator battery charger.



It's 1.4 volts per cell for fully charged batteries (so wot other kind would you have needing float charges?). Like, if you've got a 19-cell, 24-volt battery, you trickle charge it at 26.6 volts (which is the result of 19 times 1.4, Einstein).

MORE



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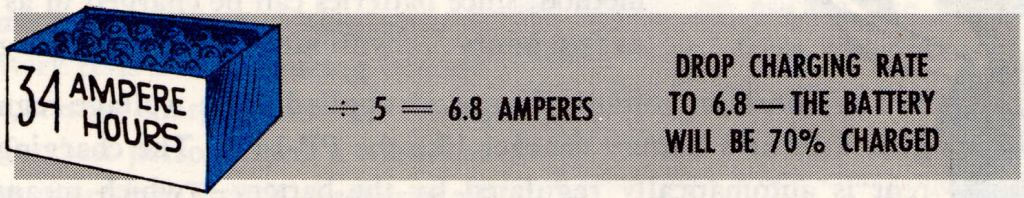

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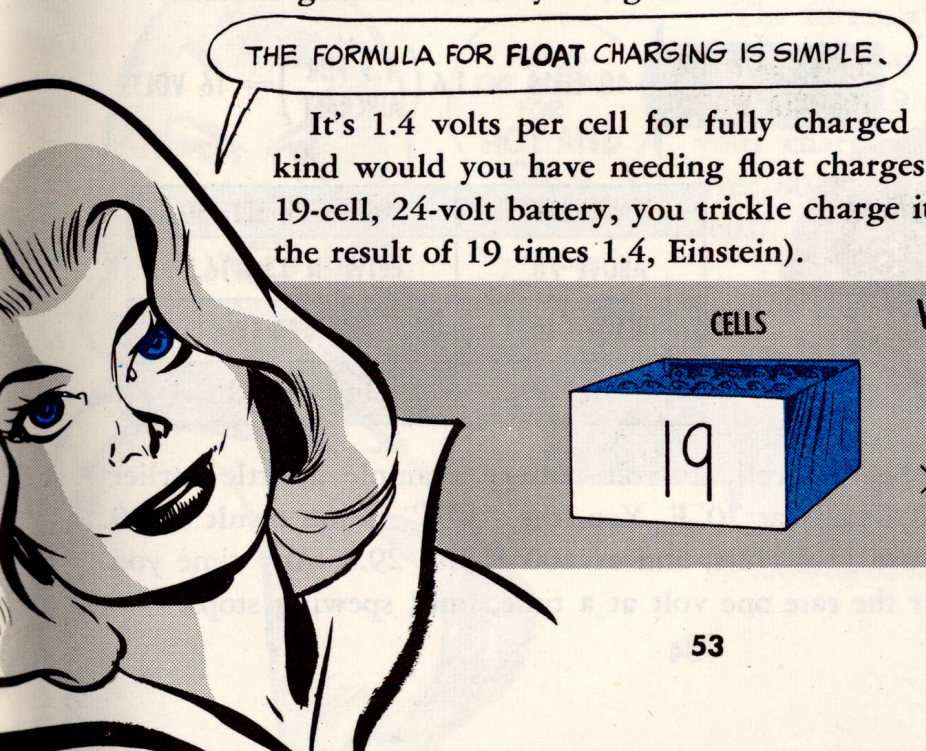

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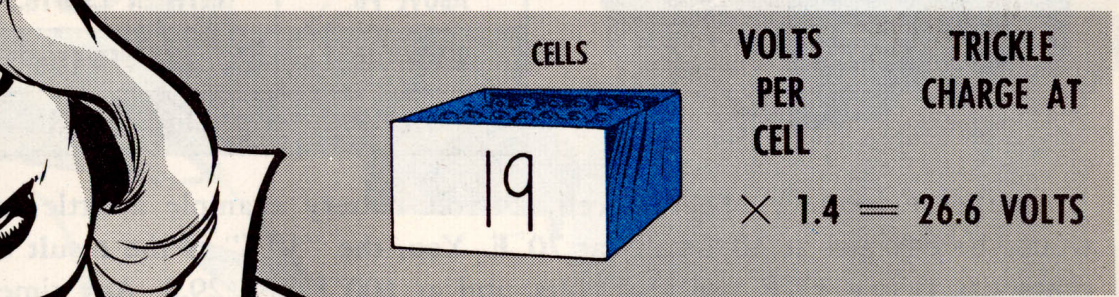
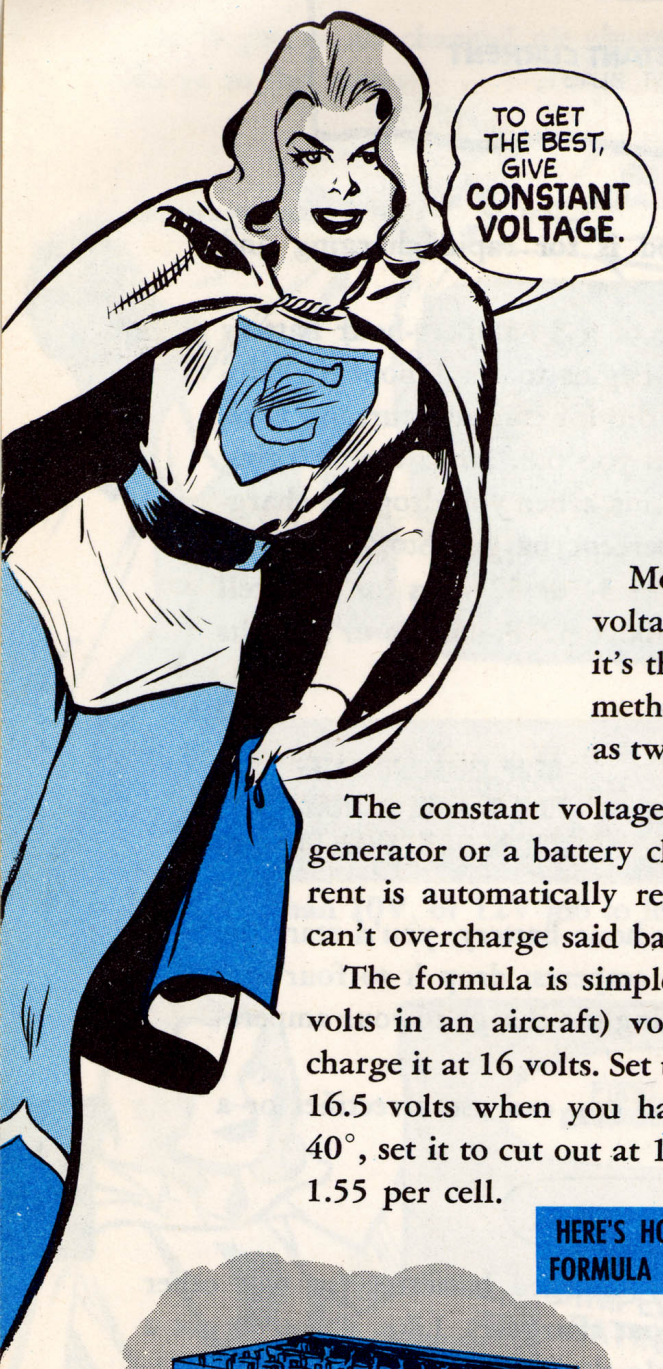
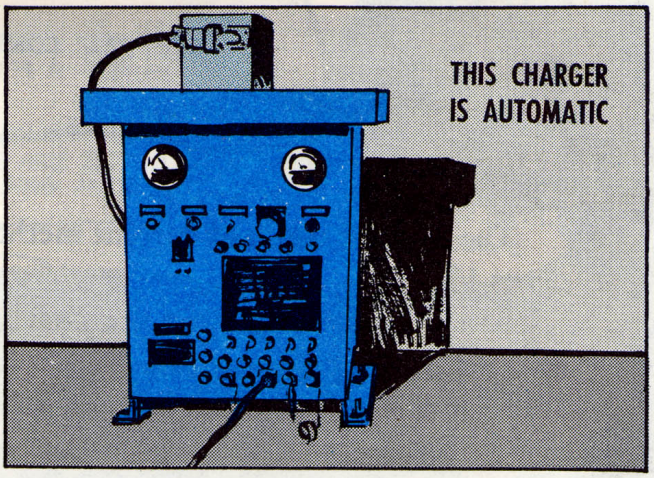


P.S. MORE



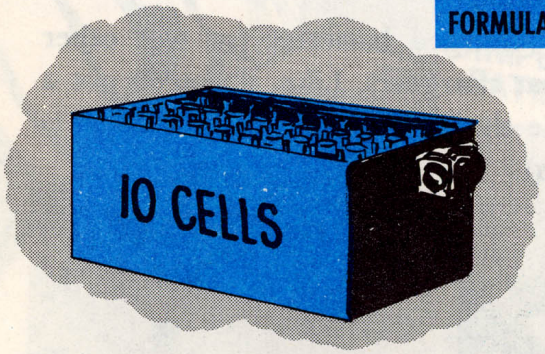


Most common, and preferred, is the constant voltage or constant potential charge. Naturally, it's the simplest, most satisfactory and dependable method, since batteries can be charged in as little as two hours . . . without first being discharged.

The constant voltage charge is applied by a voltage-regulated generator or a battery charger like the PP-1451. The charging current is automatically regulated by the battery—which means you can't overcharge said battery.

The formula is simple: Compute the voltage setting at 1.6 (1.5 volts in an aircraft) volts per cell. With a 10-cell battery, you'd charge it at 16 volts. Set the regulator to cut out at between 15.5 and 16.5 volts when you have an average temperature of 70°. Below 40°, set it to cut out at 1.65 volts per cell, and above 100°, set it at 1.55 per cell.

HERE'S HOW THE FORMULA WORKS! 10 CELLS × 1.6 (1.5 FOR AIRCRAFT) = 16 VOLTS



TEMPERATURE	REGULATOR SETTING
ABOVE 70°	BETWEEN 15.5-16.5
BELOW 40°	1.65 PER CELL
ABOVE 100°	1.55 PER CELL

Another f'rinstance: That 19-cell, 24-volt battery example a little earlier would be charged at 30.4 volts at 70°F. Yep, the "30.4" is the result of 19 times 1.6. Below 32°F, use 31.0 volts, and at 100°F, use 29.0. Any time you get excess gassing, lower the rate one volt at a time, until spewing stops.

Some ni-cad batteries (such as the BB-422 with its PU-532 generator set) have their own charging systems and generators, with instructions spelled out in TB's and TM's. If that's the case, use the specific pub instructions.

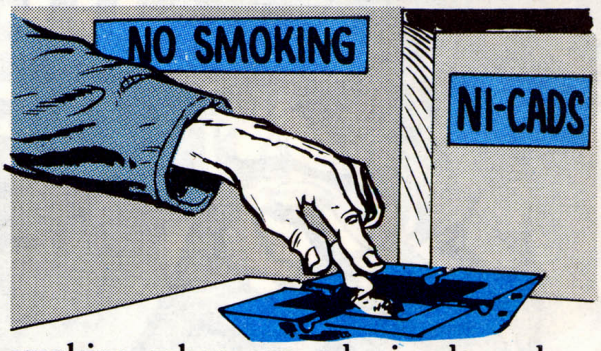
If your battery has general application, you can use the charging procedures spelled out in TM 11-6140-203-12 (2 Sep 60),—the operator and organizational maintenance TM for ni-cads.

With all ni-cads, you keep the vent plugs in place, but loose, during charging.

Some final words on charging:

Battery cells need balancing because of age, state of charge and so on. Therefore, for best performance, a complete cycling is needed. That is, discharge all cells completely (to zero volts) and then recharge them . . . which brings all cells up evenly. You may even have to do the whole cycle two or three times.

And . . . when a battery nears full charge, bubbling and gassing increases. The gas fumes are flammable. So, work in a ventilated area and knock off the



smoking when around ni-cads under charge. No kidding.

Also . . . temperature affects charging voltage on ni-cads like you've already noticed from the different settings. The wrong setting can short cells or keep the battery from being charged.

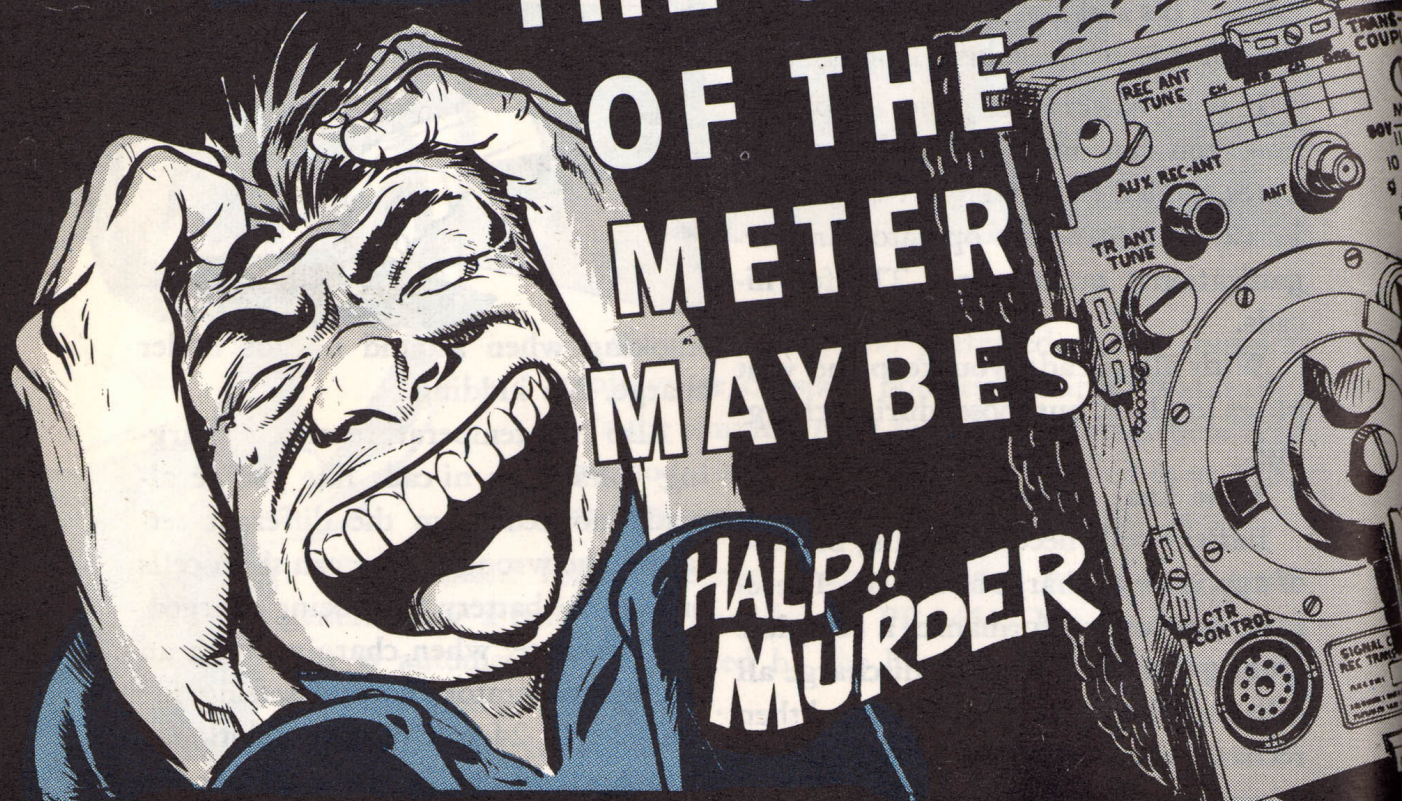
F'rinstance, when charging with an aircraft generator, normal setting for the 19-cell, 24-volt battery mentioned before would be 28.5 volts (as per the formula). The 28.5 would be good for any temperature range from 32°F to 80°F.

The formula's easy for cold or hot climes: For any range under 32°F, add a volt (for 19 cells it would be 29.5 volts charging rate). For any range over 80°F, drop a volt (27.5 for 19 cells).

FOR TEMPERATURES		
	UNDER 32°	ADD A VOLT
	OVER 80°	DROP A VOLT

END

THE CASE OF THE METER MAYBES



That innocent-looking M301 meter on your RT-66 thru -68 receiver-transmitters can be just like a lot of cute little female types, sometimes.

Like, it can tease . . . but all is not what it appears to be on the surface. It won't pay you to misread or jump to conclusions on either specie.

F'rinstance, say you're putting out a message down the line on your Greasy-3 radio set. You catch the M301 meter of the RT-66 in the corner of your eye —and reach for the panic button.

Why? Because there's not even a flicker of power output showing on the meter. So, you figure your set's stopped puttin' out for you.

But—**stop right there ! !**

Things may not be what they seem, so don't push the P-button . . . yet.

Actually, there's a tiny electronic gizmo that cuts the meter into the circuitry system. Maybe the only thing wrong with your set is that the gizmo (some people call it a diode) has burned out. It does not affect the output of your transmitter one little bit.

The moral: don't get off the net just because your meter got coy. Keep operating, and you'll find out soon enough whether you've got a sad set or just a mute meter. Naturally, if you find out the set's not putting out, it's time to call in your repairman.

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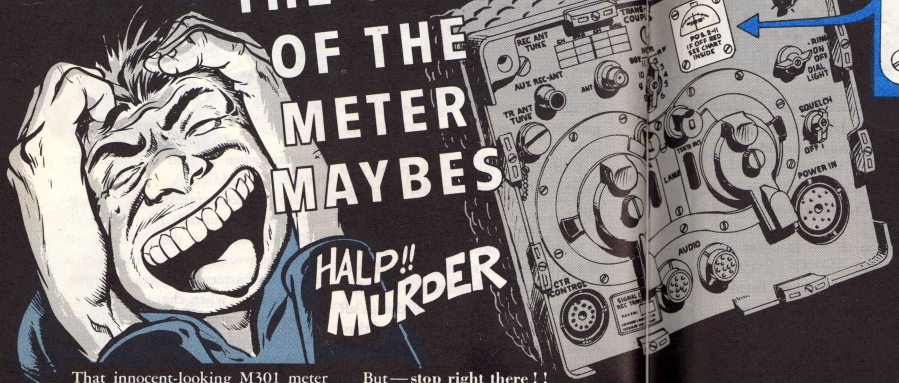

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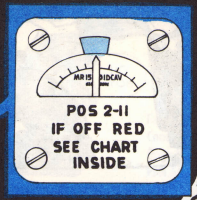
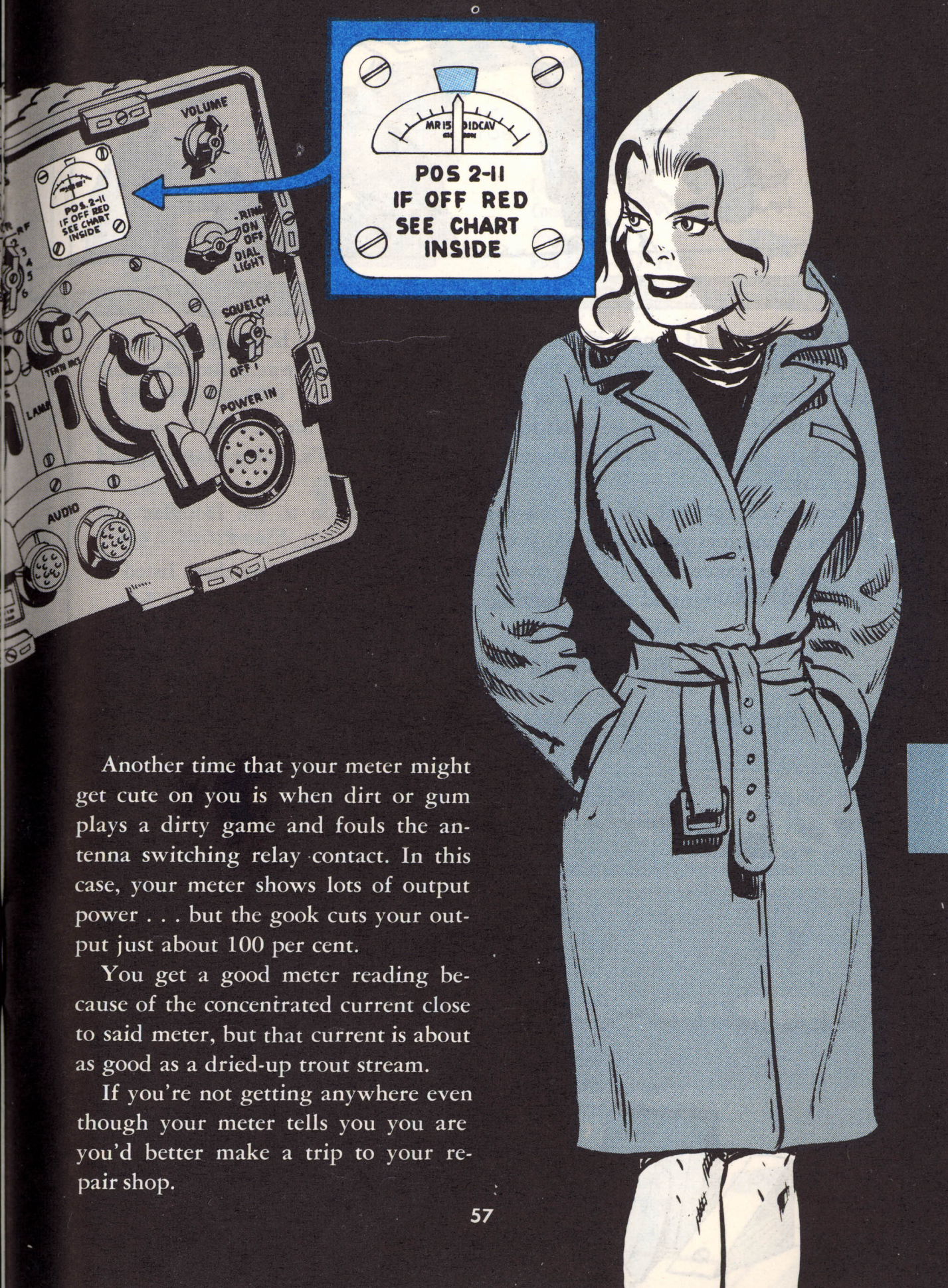


Another time that your meter might get cute on you is when dirt or gum plays a dirty game and fouls the antenna switching relay contact. In this case, your meter shows lots of output power . . . but the gook cuts your output just about 100 per cent.

You get a good meter reading because of the concentrated current close to said meter, but that current is about as good as a dried-up trout stream.

If you're not getting anywhere even though your meter tells you you are you'd better make a trip to your repair shop.



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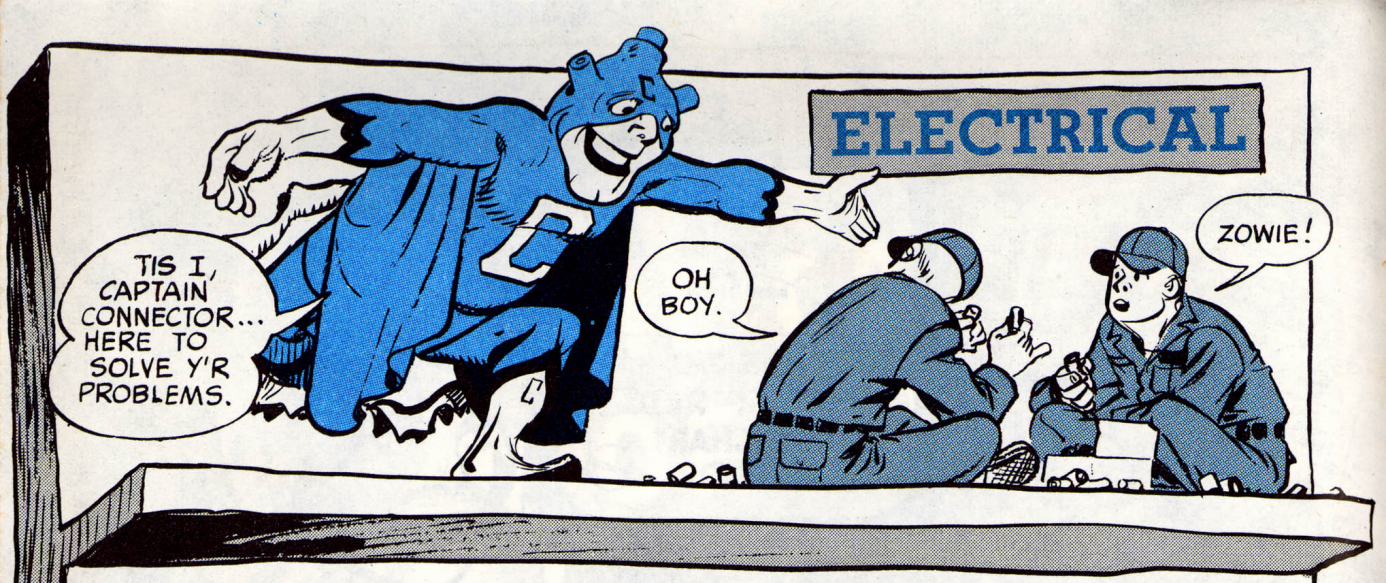


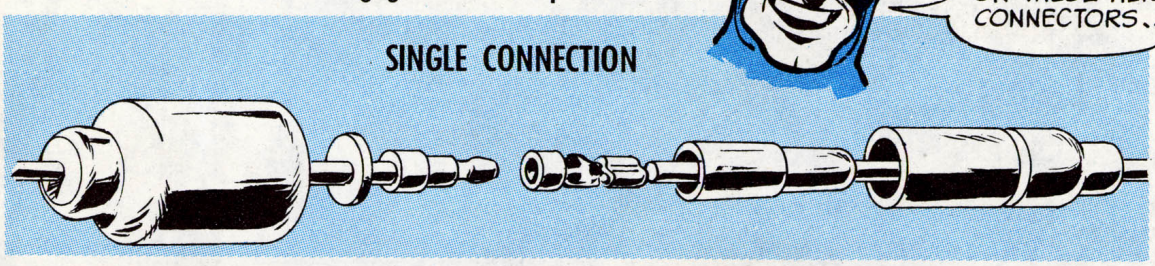
It's the same old tune with different words, but you've heard it before . . . "For the want of a washer (or a connector, or a ferrule) the waterproof electrical system went out and the truck was lost."

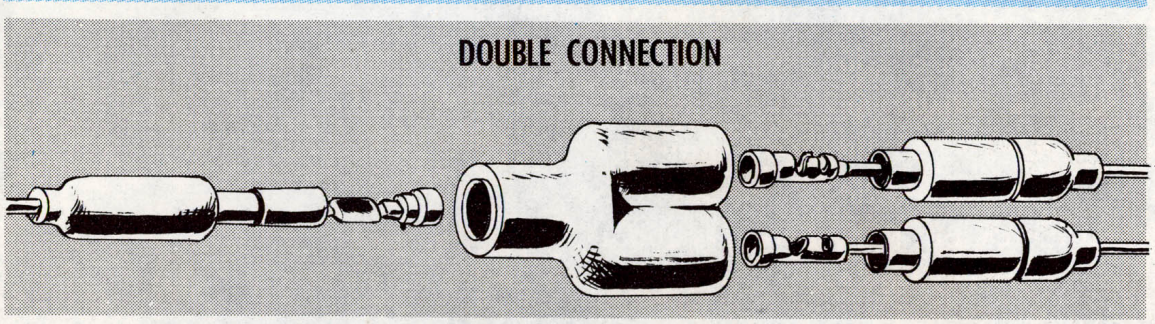
You don't have to find yourself in a spot like that. No Sir-e-e-e. All you have to do is to know how to match up your connectors, FSN's, nomenclatures, and wire gage.

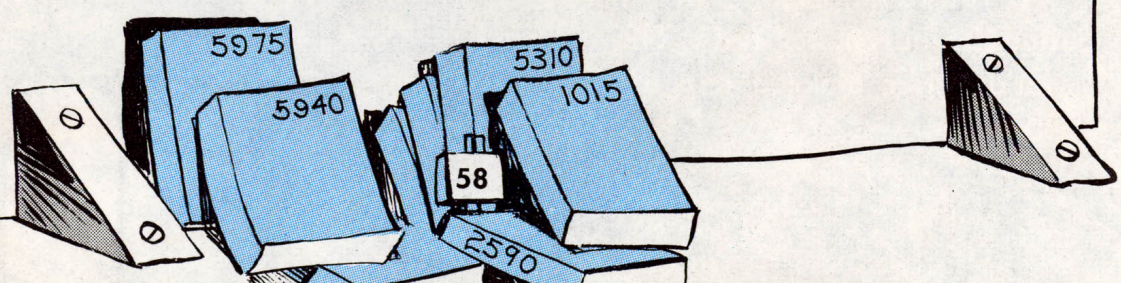
Remember, these electrical connectors are in addition to the Douglas and Bendix connectors you find in SM 9-4-5935-SO1 (May 62).

These connectors aren't listed as a kit in one SM. You'll find them listed in your DOD catalogs and supply catalogs.

FOR 14 AND 16 GAGE CABLE
(On 12-gage do not use plastic sleeve)

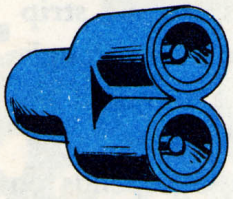






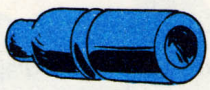
CONNECTORS

Connector Assy "Y"
Gage Wire 12, 14, 16
FSN 5935-699-9004



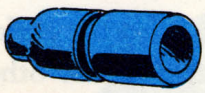
Shell, Male (Rubber)
Gage Wire 16
FSN 5975-660-5962

Shell, Male (Rubber)
Gage Wire 14
FSN 5935-833-8561

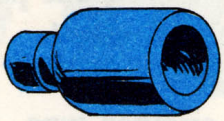


Shell, Male, Ribbed
(Rubber)
Gage Wire 14
FSN 5935-399-6673

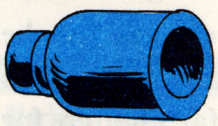
Shell, Male (Rubber)
Gage Wire 12
FSN 2590-695-9076



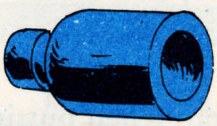
Shell, Female (Rubber)
Gage Wire 16
FSN 5935-691-5591



Shell, Female (Rubber)
Gage Wire 14
FSN 1015-833-8566



Shell, Female (Rubber)
Gage Wire 12
FSN 2590-695-9077



Ferrule, Electrical
Connector
Gage Wire 16
FSN 5940-057-2931

Ferrule, Electrical
Connector
Gage Wire 14
FSN 5940-057-2929

Ferrule, Electrical
Connector
Gage Wire 12
FSN 5940-057-2930

Terminal Assy (Female)
(solder)
Gage Wire 12, 14, 16
FSN 1015-798-2997

Terminal Assy (Female)
(Crimp)
Gage Wire 12, 14, 16
FSN 5940-399-6676

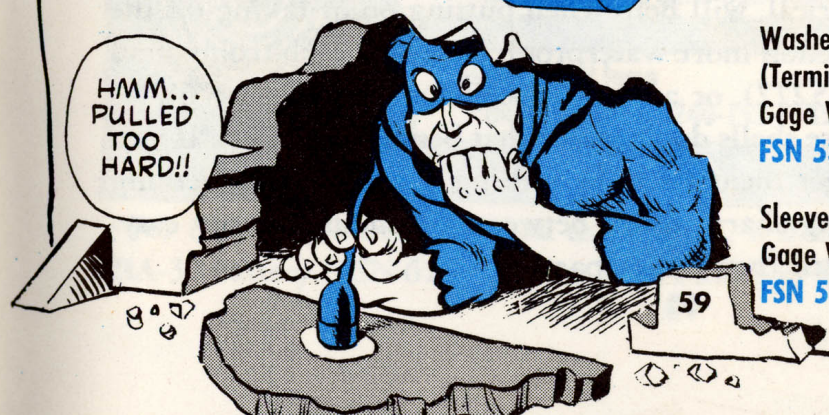
Washer, "C" (Terminal
Retaining)
Gage Wire 16
FSN 5310-656-0067

Washer, (Slotted) "C"
(Terminal Retaining)
Gage Wire 14
FSN 5310-833-8567

Washer "C" (Terminal
Retaining)
Gage Wire 12
FSN 5310-595-7044

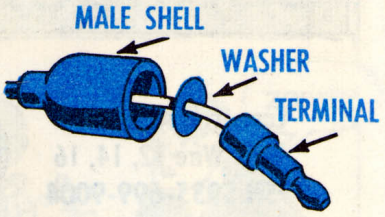
Washer, Plain,
(Terminal Retaining)
Gage Wire 12 (only)
FSN 5310-298-8903

Sleeve, Insert Plastic
Gage Wire 14, 16
FSN 5970-833-8562

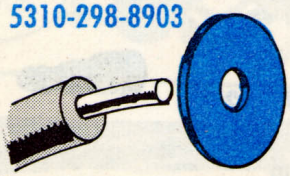


PS MORE

In case you're not quite sure how a good connection is made, here're some hints.



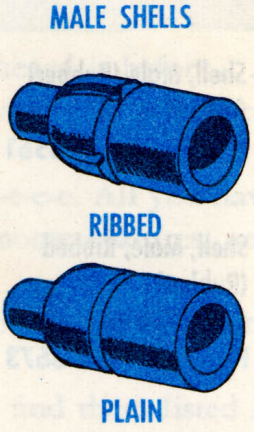
You push the wire through the male shell and strip off the insulation. Then you put the stripped wire through the small hole in the washer. Next slip a terminal on the stripped wire, then crimp or solder in place.



The part you use depends on the gage wire you're using (12, 14, or 16 AWG wire).

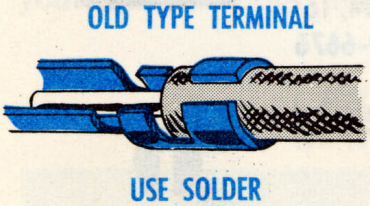
When you use the 12-gage wire you don't use the plastic sleeve with the male shell, but use washer FSN 5310-298-8903 instead.

There're two types of male shells — ribbed and plain — you can use to identify the hookups on polarized units.

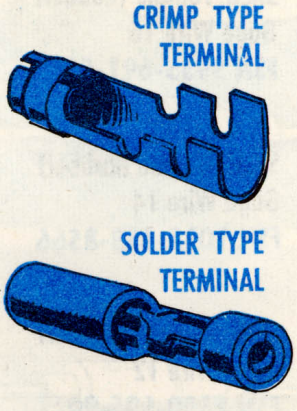


The earlier type female (metal) terminals would spread so the male terminal had poor contact or none at all, so a metal ring was added to the female. The ring keeps the terminal from spreading and it keeps the terminal round so you'll get a good contact.

You'll find two female metal terminals in the supply system. They both have that metal ring. You should know how to attach the wire to each.



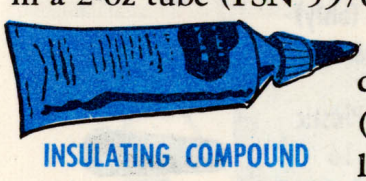
If you get the one with the solid sleeve, you crimp the wire to the terminal. On the other one the larger tabs are bent around the insulated part of the wire and the small tabs are bent around the peeled wire and then it gets soldered into the terminal.



If you're using 12-gage wire, it's better to use the crimped type. You can use the soldered or crimped type with the 14 or 16 AWG wire.

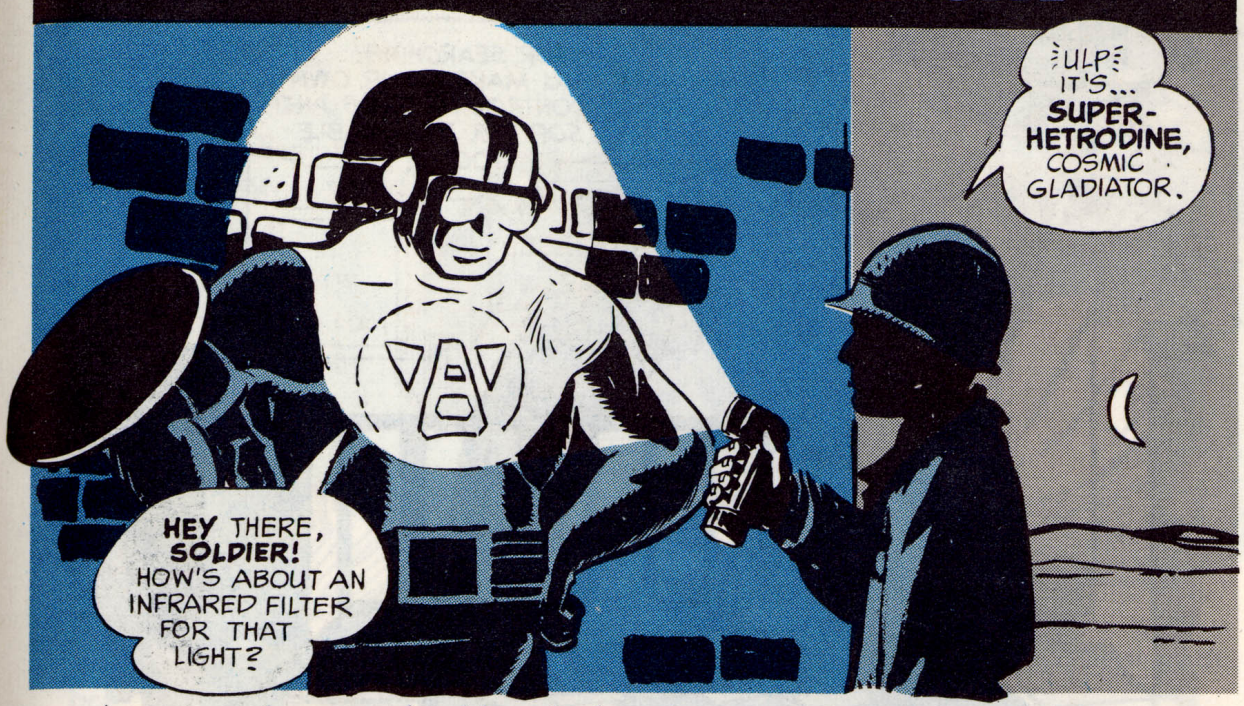
When you do have to use the soldered-on type for the 12-gage wire, you have to use the small washer (FSN 5310-298-8903). Peel off the insulation far enough for slipping the washer on, bend the tabs over, and solder the wire in place. The washer goes between the insulation and terminal.

Insulating Compound, Electrical, will help when putting on or taking off the shells. It also makes the connection more waterproof. You can get the compound in a 2-oz tube (FSN 5970-224-5277), or an 8-oz tube (FSN 5970-224-5276).

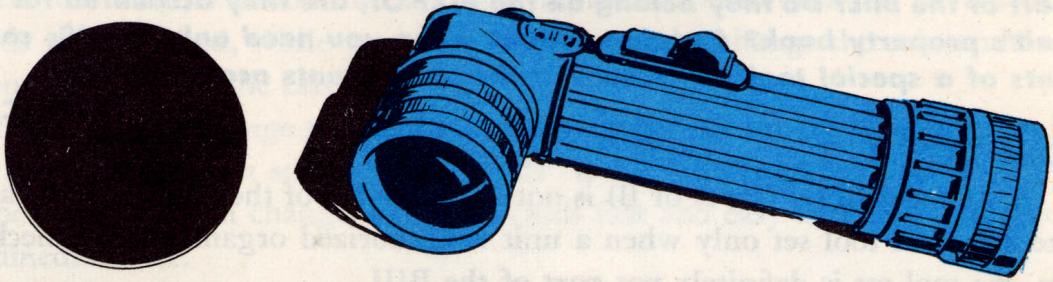


Those shells don't go for that bending business. If you can't get them apart by pulling, then insert something (nothing sharp) down between the shells and pry easy-like until they come apart.

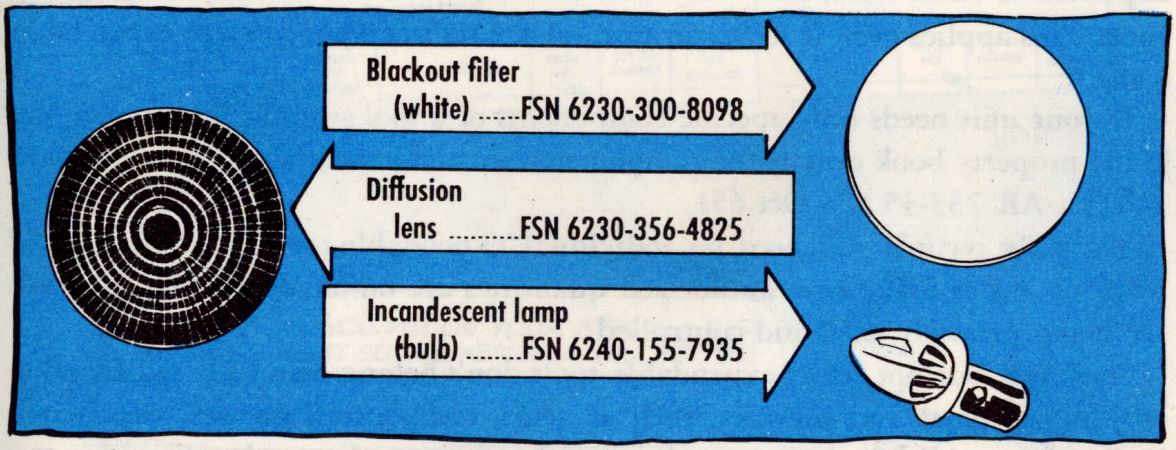
LITTLE LIST FOR LIGHT



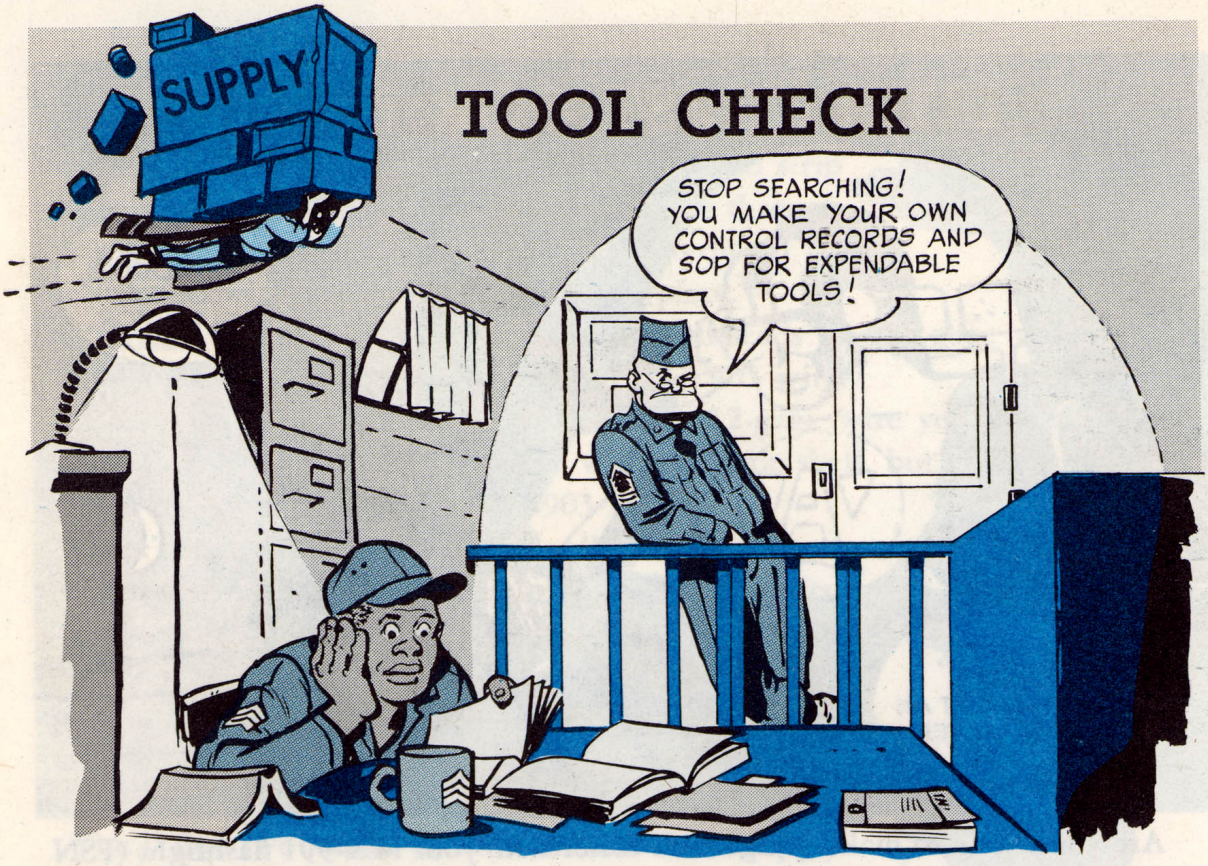
Are you trying to make things look rosier with your MX-991 flashlight (FSN 6230-264-8261)? Well then, get yourself an infrared light filter, using FSN 5850-508-3040. It's listed in SC 5850-IL, dated Dec 64.



And, while you're at it you can go through Vol 2 of C 6200-IL-A (Jan 66) and latch onto these:



For throwing a little light on the subject, it'll take power like you get from a BA-30 battery (FSN 6135-120-1020) which is in SC 6135/40-IL,dated Mar 65.



Dear Half-Mast,

How about the special tool sets authorized by a vehicle's TM -20P? Are they part of the BIIL? Do they belong on the PLL? Or, are they accounted for on the unit's property book? And, how about when you need only specific components of a special tool set? How are the components accounted for?

SFC C. L. T.

Dear SFC C. L. T.,

A special tool set (set A or B) is not a component of the vehicle. TM's authorize a special tool set only when a unit is authorized organizational mechanics, so, the tool set is definitely not part of the BIIL.

Furthermore, a tool set, whether it costs $5 or $100 is issued as a **non-expendable** item. And, that means it must be accounted for in your property book. This applies even if some, or most, of the set's components are expendable items.

If your unit needs only specific components of a tool set, you account for 'em in the property book only if the components are non-expendable items. See para 3-2c(5), AR 735-35 (25 Oct 65).

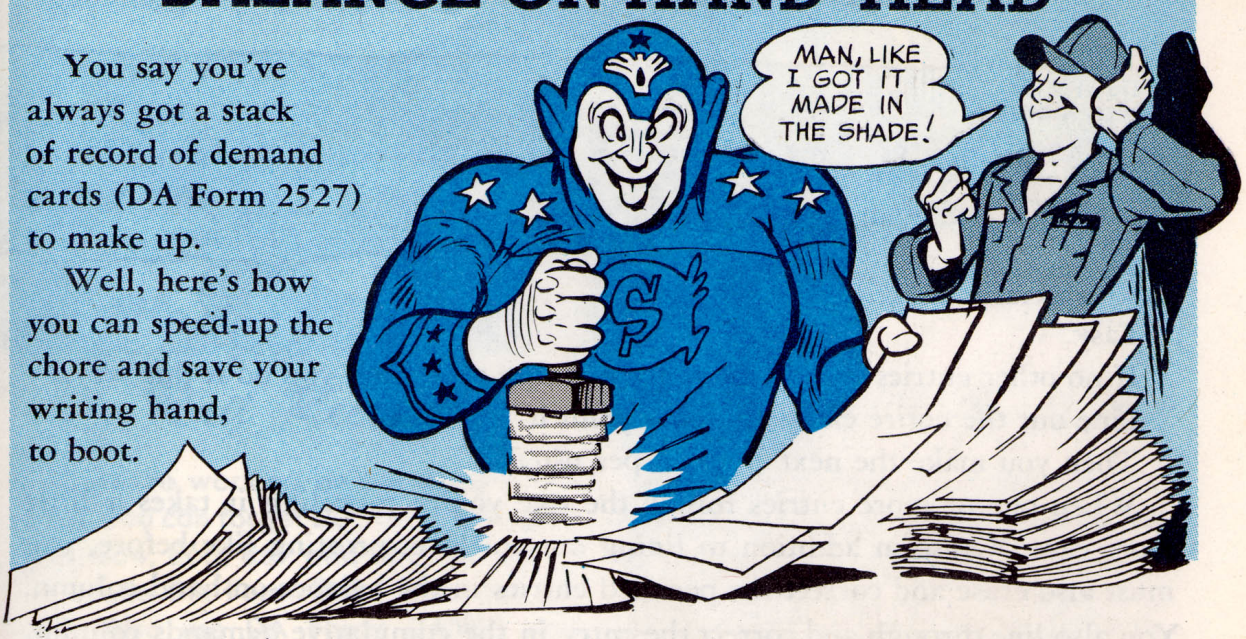
The only records you need on individual, expendable tools are those the Old Man sets up to make sure authorized quantities are on-hand and that the tools are being properly used and controlled.

And, last but not least, expendable tools don't belong on a PLL. A PLL takes only repair parts and supplies, such as acids, compounds, greases, steel wool, sandpaper, welding supplies, equipment cleaning supplies, paint, etc., that are authorized by equipment manuals. Para 6-2 in AR 735-35 tells the story.

BALANCE-ON-HAND HEAD

You say you've always got a stack of record of demand cards (DA Form 2527) to make up.

Well, here's how you can speed-up the chore and save your writing hand, to boot.



Cut yourself a stencil (or ditto master) to change the card's "document number" columns to "BOH" columns.

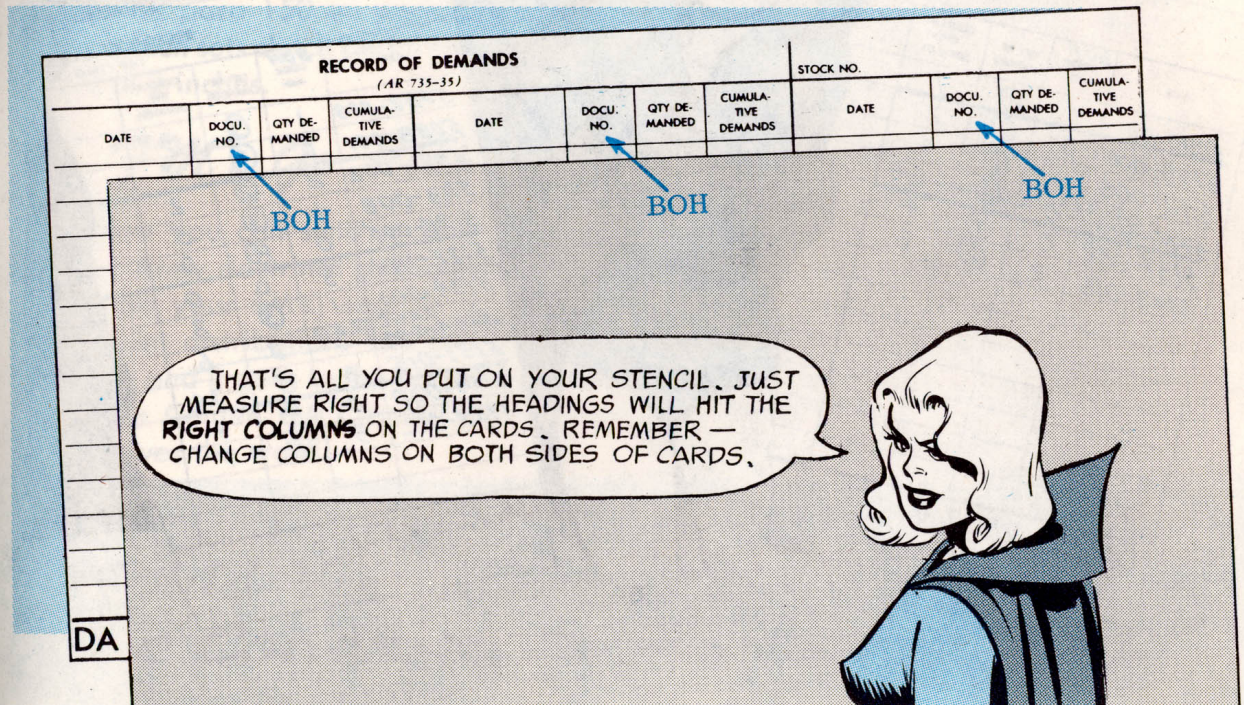
With typing care you can cut the stencil so the three columns on the card can be changed at one time.

Then you can look around for a kindly reproduction section and have a slew of cards run off. And, while you're at it, remember to change the column headings on both sides of the cards.

Another way to change the card is with a rubber stamp. If your outfit will OK it, order yourself a stamp which reads "BOH" and just stamp away.

Either way you can change a slew of cards fast and easy and have 'em ready for immediate use.

AR 735-35, para 6-4c(2), gives the OK on changing the column headings.



ROD CARD CANCELING

Dear Connie,
What's the proper way to cancel a request entered on DA Form 2527?
SP4 R. E. D.

Dear Specialist R. E. D.,

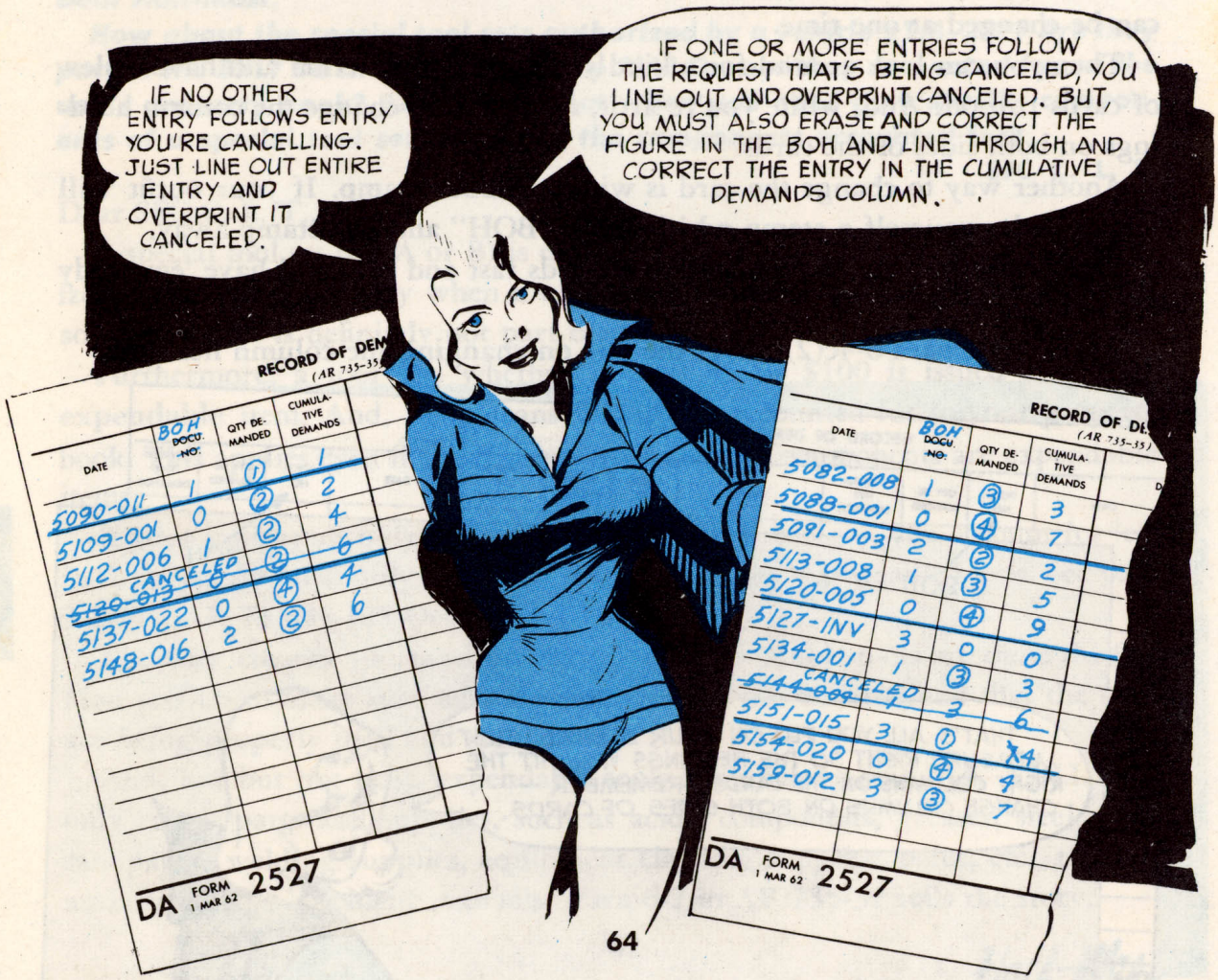
Easy.

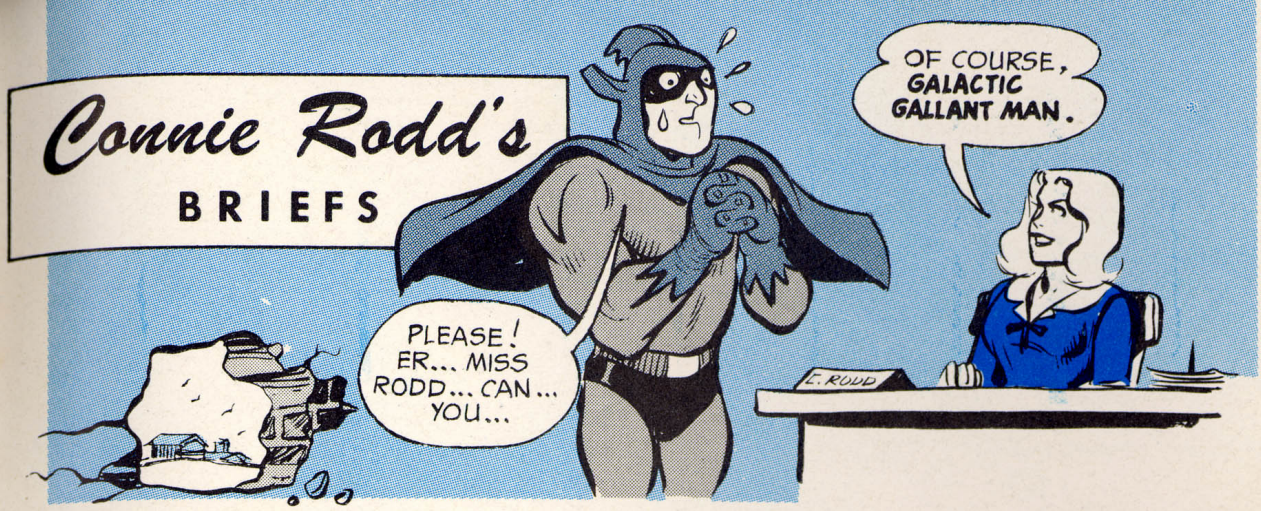
If no other entries follow the request you're canceling, you do it this way: Line out the entire entry and over-print it "canceled."

Then you make the next entry as per usual.

When one or more entries follow the one you're canceling it takes a little more care. 'Cause in addition to lining out and over-printing like before, you must also erase and correct the penciled entries in the balance-on-hand column. You also line through and correct the entry in the cumulative demands column.

Also, remember to make the cancellation note in your document register, if it's needed. See AR 735-35 (25 Oct 65) Fig 6-2.





Rail Records

If you're working on the Army's railroad, you can forget DD Forms 860, 861, 863, 864, 866, 867 and 868. Instead of these use DA Form 2404 from TM 38-750. Also use DA Forms 2408-1 and 2408-2 instead of DD Form 865. Hang onto DD Form 862, though. You still need that as spelled out in DA Cir 750-10 (4 Aug 65). The circular's your authority till TM's 55-201, 202 and 203 and AR 750-2200-1 get updated.

All the Same Now

If you're confused about correct clutch pedal free travel for the G742-series 2½-ton trucks, watch for Change 2 (30 Dec 65) to TM 9-2320-209-20 (Apr 65). It corrects Item 5 on page 35 to read the same as para 150 on page 262 of the TM, which sets clutch pedal free-travel at 1½ to 2 inches.

FM's Go Pinpoint

Now you can send in your order to have Army doctrinal publications (these include your FM's) sent to your outfit pinpoint distribution. You use DA Form 12-11 and it goes to the Baltimore Publications Center. DA Circular 310-3 (Jan 66) gives the word.

Hawkmen: H-E-L-P!

Anytime you replace a chassis in your Hawk system make sure and certain the unserviceable unit goes back to support! Those chassis have to be repaired or rebuilt real fast to keep the supply lines flowing—and this can't be done if they're gathering dust in your shop. So track 'em down, dig 'em up and send 'em back for repair soonest! The chassis you save may be your own!

Vehicle Cover Change

The closure covers used to protect vehicles during shipment are now accountable items and they're no longer expendable. TB 9-2300-278-20 (Sep 65) has the dope. So... a little more care and caution is called for in handling and using those big beasts.

M35 A1 Starter MWO

Replacement starter for the 2½-ton multifuel trucks with the LDS 427-2 engine is FSN 2920-763-2346. But if the original starter is still good, your support will set you up with the same design as the new starter by applying MWO 9-2920-236-30/1 (Dec 65).

Would You Stake Your Life *right now* on the Condition of Your Equipment?

WHEN YOU BUILD UP A LOAD OF PARTS TO "PROTECT" YOUR OUTFIT AGAINST THE FUTURE YOU'RE NOT BEING AS SMART AS YOU THINK!!

WHY? . . . BECAUSE UNREALISTIC PARTS ORDERING CREATES **UNREALISTIC** STOCKING AT SUPPORT AND THE RESULT IS, SOMEBODY ELSE WILL BE HURTING!

NOW, IF THE OTHER GUY DOES TO YOU WHAT YOU DO TO HIM . . . **YOU** GET HURT.

SO, ORDER WHAT YOU NEED IF, WHEN, AND AS YOU NEED IT. NO MORE NO LESS.

THE SYSTEM WORKS IF **YOU** MAKE IT WORK!